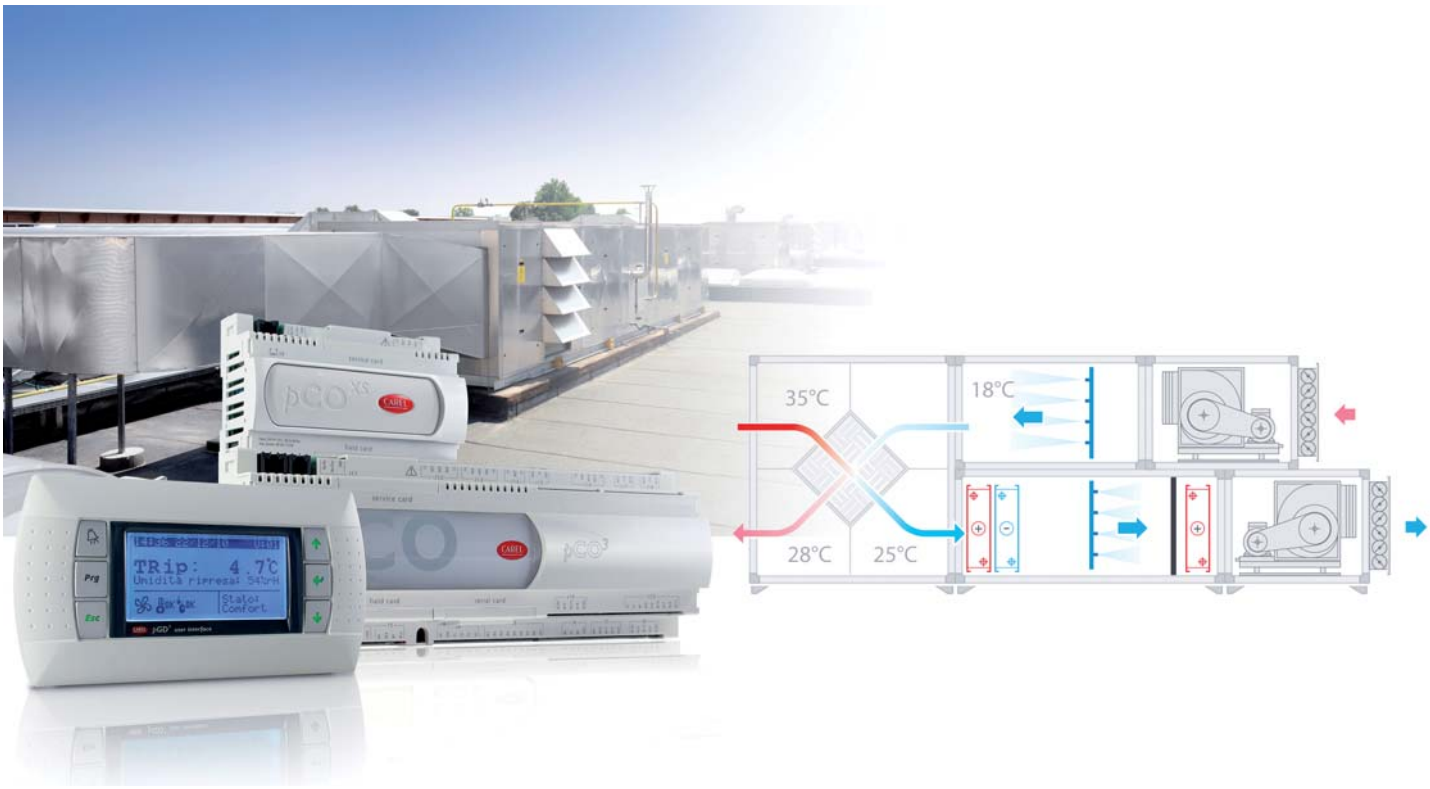
# FLSTDMAHUE

Application for managing air handling units




## ENG User manual

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NO POWER & SIGNAL CABLES TOGETHER

READ CAREFULLY IN THE TEXT!

Integrated Control Solutions & Energy Savings

## WARNINGS

CAREL bases the development of its products on decades of experience in HVAC, on the continuous investments in technological innovations to products, procedures and strict quality processes with in-circuit and functional testing on 100% of its products, and on the most innovative production technology available on the market. CAREL and its subYESdiaries nonetheless cannot guarantee that all the aspects of the product and the software included with the product respond to the requirements of the final application, despite the product being developed according to start-of-the-art techniques.
The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment.
CAREL may, based on specific agreements, act as a consultant for the poYEStive commisYESoning of the final unit/application, however in no case does it accept liability for the correct operation of the final equipment/system.

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the webYESte www.CAREL.com.
Each CAREL product, in relation to its advanced level of technology, requires setup / configuration / programming / commisYESoning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases.
Only qualified personnel may install or carry out technical service on the product.
The customer must only use the product in the manner described in the documentation relating to the product.

In addition to observing any further warnings described in this manual, the following warnings must be heeded for all CAREL products:

- Prevent the electronic circuits from getting wet. Rain, humidity and all types of liquids or condensate contain corroYESve minerals that may damage the electronic circuits. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not install the device in particularly hot environments. Too high temperatures may reduce the life of electronic devices, damage them and deform or melt the plastic parts. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not attempt to open the device in any way other than described in the manual.
- Do not drop, hit or shake the device, as the internal circuits and mechanisms may be irreparably damaged.
- Do not use corroYESve chemicals, solvents or aggressive detergents to clean the device.
- Do not use the product for applications other than those specified in the technical manual.

All of the above suggestions likewise apply to the controllers, serial boards, programming keys or any other accessory in the CAREL product portfolio.
CAREL adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning.

The technical specifications shown in the manual may be changed without prior warning.

The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the webYESte www.CAREL.com and/or by specific agreements with customers; specifically, to the extent where allowed by applicable legislation, in no case will CAREL, its employees or subYESdiaries be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or imposYESbility to use the product, even if CAREL or its subYESdiaries are warned of the posYESbility of such damage.

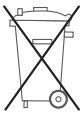
The product must be installed with the earthconnected, using the special yellow-green terminal on the terminal block. Do not use the neutral for the earth connection.


**WARNING:** separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel wiring) and signal cables in the same conduits

**Warranty on the materials:** 2 years (from the date of production, excluding consumables).

**Approval:** the quality and safety of CAREL INDUSTRIES Hqs products are guaranteed by the ISO 9001 certified design and production system.

## DISPOSAL



INFORMATION FOR USERS ON THE CORRECT HANDLING OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:

- WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
- the public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
- the equipment may contain hazardous substances: the improper use or
- incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeled bin) shown on the product or on the
- packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

# Content

# 1. INTRODUCTION

FLSTDMAHUE is an application program developed by CAREL for the management of air handling units (AHU). It runs on the pCO range of programmable controllers (pCO3 small, medium, large or pCOXS 1+1Mbyte (*)), selected according to the complexity of the unit, and the pGD1 terminal. Its main feature is its adaptability to many types of air handling unit, with different types of probes and actuators, on/off type or modulating. Moreover, the possibility to connect up to two pCOe serial options via RS485 card allows additional probes and outputs to be added, ensuring maximum flexibility. Alternatively, the MP-Bus® card can be used to connect up to 8 Belimo®, actuators each with its probe or digital input; this eliminates a lot of the wiring needed during installation. CAREL temperature, humidity and combined serial probes can be connected, for both rooms and ducts, as well as active differential pressure probes, flow switches and pressure switches to signal alarms following faults on fans or pumps. The supply and return air fans can be controlled by inverter based on static pressure or fixed speed. The control software can manage temperature or humidity as the priority, control an adiabatic or isothermal humidifier, freecooling/freeheating based on enthalpy and humidity recovery using a heat wheel. The commissioning procedure is based on the documented design of the air handling unit being controlled: the inputs and outputs can be assigned dynamically, meaning there is no fixed position for the various types of probes/actuators connected, with the software proposing the first position available for the type of input/output (e.g. a certain input can accept a passive NTC probe or active probe with 0 to 1 V or 4 to 20 mA output). The identification of the type of AHU being controlled is not based on the choice between a certain number of pre-configured units; rather the selection of the devices installed on the AHU (e.g. preheating / cooling / reheating coils, fans, pumps, inverter, heaters, dampers, humidifiers, heat recovery unit) and then setting their parameters. This simplifies configuration, as the user only sees the parameters relating to the components used. Changes can be made subsequently to the configuration without needing to start again from scratch.
(*) pCOXS 1+1Mbyte in the 1tool programming environment is called pCO1XSE.

## 1.1 Main features

- parameter settings divided by level, user, installer or manufacturer, with password-protected access;
- temperature and/or humidity control with differentiated set point in cooling and heating;
- automatic cooling/heating changeover;
- set point compensation in cooling and heating;
- selection of up to four daily time bands, with settings for each operating mode;
- holiday and special day function, with reduced set point;
- cascaded control of heating / cooling devices so as to maximise energy saving;
- operation in comfort, precomfort or economy mode, if time bands are enabled;
- management of pumps, including in tandem, for preheating cooling/reheating coils, with rotation, backup, overload alarms and anti-blocking for each pump;
- minimum water temperature limit settable for opening the coil valves;
- dehumidification by cooling (including with dewpoint control - dewpoint) and reheating coil;
- bands for activating the preheating and reheating devices can be overlapped to supplement each other;
- ON/OFF or modulating control of isothermal or adiabatic humidifiers;
- "freecooling" and "freeheating" based on temperature or enthalpy;
- heat recovery with cross-flow heat recovery unit, run-around coil or heat wheel, based on temperature or enthalpy;
- control by inverter of fans at constant pressure or constant speed;
- management of fans, including in tandem, with rotation and backup functions;
- air quality control with CO2 and VOC (volatile organic compounds) probes;
- safety protectors for antifreeze, dirty filters, smoke/fire, no air or water flow, humidifier alarm, inverter alarm, open door alarm;
- unit antifreeze and room protection;
- up to 4 independent auxiliary control loops, each with its own PI control and control probe (for example to manage a second humidifier);
- input/output test to check correctness of wiring during installation;
- connection via FieldBus port and corresponding RS485 serial card (accessory) to serial probes, inverters, pCOe expansion card;
- connection via BMS port and corresponding RS485 serial card (accessory) to a supervisory system (PlantVisorPro, PlantWatch…), transferring the readings of 4 probes.

## 1.2 Accessories available for FLSTDMAHUE

Below is a list of devices suitable for use with FLSTDMAHUE.
CAREL features passive, active and serial temperature, humidity and differential pressure probes, for room or duct installation, specifically for the air handling unit appliance. See the CAREL price list for the complete list.

### Room temperature and humidity sensor

Temperature sensors

| Cod. | Type | Range |
|---|---|---|
| DPWT011000 | NTC | -10T60°C |
| DPWT010000 | 0…1 V, 4…20 mA | |
| DPWT014000 | Opto RS485 serial | |

Temperature and humidity sensors

| Cod. | Type | Range |
|---|---|---|
| DPWC112000 | 0…10 V, 0…10 V | -10T60°C,10…90% U.R. |
| DPWC115000 | NTC, 0…10V | |
| DPWC110000 | 0…1 V, 4…20 mA | |
| DPWC114000 | Opto RS485 serial | |
| DPWC111000 | NTC, 0…1V, 4…20mA | |
| DPPC112000 | 0…10 V, 0…10 V | -10T60°C,10…90% U.R. |
| DPPC110000 | 0…1 V, 4…20mA | |
| DPPC111000 | NTC, 0…1 V, 4…20mA | |

### Duct temperature and humidity sensor

Temperature sensors

| Cod. | Type | Range |
|---|---|---|
| DPDT011000 | NTC | -20T70°C |
| DPDT010000 | 0…1 V, 4…20 mA | |
| DPDT014000 | Opto RS485 serial | -20T60°C |

Temperature and humidity sensors

| Cod. | Type | Range |
|---|---|---|
| DPDC112000 | 0…10 V, 0…10 V | -10T60°C, 10…90% U.R. |
| DPDC110000 | 0…1 V, 4…20 mA | |
| DPDC111000 | NTC, 0…1V, 4…20mA | |
| DPDC114000 | Opto RS485 serial | |

## NTC temperature sensors

| Cod. | Type | Range |
|---|---|---|
| NTC*HP* | 10 kΩ±1%@25 °C, IP67 | -50…105/50°C (aria/ fluido) |
| NTC*WF* | 10 kΩ±1%@25 °C (Fast), IP67 | -50…105°C (fast) |
| NTC*WP* | 10 kΩ±1%@25 °C, IP68 | -50…105°C |
| NTC*HF* | 10 kΩ±1%@25 °C,strap-on, IP67 | -50…90°C |
| | | |
| | | |

## Room air quality sensors

DPWQ* DPDQ*

$CO_2$ sensors

| Cod. | Range | Output |
|---|---|---|
| DPWQ402000 | 0…2000 ppm | 0…10 V |
| DPDQ402000 | 0…2000 ppm | 0…10 V |

$CO_2$ & VOC sensors

| Cod. | Range | | Output |
|---|---|---|---|
| | $CO_2$ | VOC | |
| DPWQ502000 | 0…2000 ppm | 0…100 % | 0…10 V, 0…10 V |
| DPDQ502000 | 0…2000 ppm | 0…100 % | 0…10 V, 0…10 V |

## Differential air pressure sensors

| Cod. | Range | Output |
|---|---|---|
| SPKT00C5N0 | 0…0.5 mbar | 4…20 mA |
| SPKT0065N0 | 0…10 mbar | 4…20 mA |
| SPKT0075N0 | 0…25 mbar | 4…20 mA |

## Differential air pressure switches/flow switche

Pressure switches

| Cod. | Range | Output |
|---|---|---|
| DCPD000100 | 0.5…5 mbar | ON/OFF |
| DCPD001100 | 0.2…2 mbar | ON/OFF |

Flow switches

| Cod. | Range | Output |
|---|---|---|
| DCFL000100 | 1…9 m/s | ON/OFF |

## Smoke and fire sensors

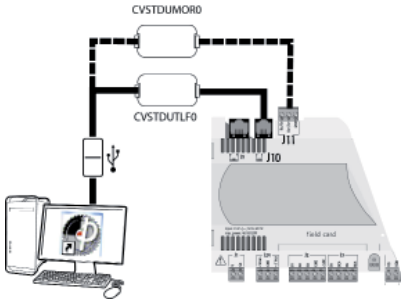
| Cod. | Tipo | Output |
|---|---|---|
| SFFS000000 | Rilevatore di fumo, alim 24 Vdc | ON/OFF |
| SFFF000000 | Rilevatore di fuoco, alim 24 Vdc | ON/OFF |

## USB /RS485 converter code CVSTDUTLF0/ CVSTDUMOR0

CVSTDUTLFO CVSTDUMOR0

The USB/RS485 converter code CVSTDUTLF0 is used to connect a personal computer running the pCO Manager program to the pLAN port (J10) on the pCO controller, via a telephone connector. Alternatively, converter code CVSTDUMOR0 connects to the pLAN port (J11) or the BMS port, fitted with a special serial card. Once the connection has been made, the application program software can be loaded and the parameters set. See chapters "Software installation" and "Appendix".

## pCO Manager




This program, downloadable from http://ksa.carel.com, is used to modify the parameters based on the application, save them and then copy the settings directly to the application. The USB/RS485 converters codes CVSTDUTLF0/ CVSTDUMOR0 must be connected between the computer and the RS485 port on the pCO, to terminals J10/J11 respectively.

## Smart key cod. pCOS00AKY0

Smart key PCOS00AKC0

The Smart key is an electronic device used to program and service the pCO family controllers. It simplifies the transfer of data between the controllers installed and a personal computer by exploiting the high capacity flash memory for storing software applications, BIOS and variable logs. The pCO is connected directly via the telephone connector using the cable supplied, while to transfer the data to a personal computer, the USB adapter code PCOS00AKC0 is required. The power supply comes either via the USB port on the PC or from the controller, therefore no external power supply is needed.

## Optically-isolated fieldbus RS485 card code PCO100FD10

This card is used to connect the Fieldbus serial port on the pCO to an RS485 network. It is installed in the slot marked "field card", when needing to connect serial probes, CAREL VFD inverters or pCOe expansion cards.

### Belimo MP-BUS card code PCO100MPB0

This card connects the pCO to an MP-Bus network of I/O devices that use the Belimo® standard. Up to 8 actuators can be connected at the same time, over a maximum distance of 30 m. It is installed in the slot marked "field card"..

### BMS 485/Modbus card code PCOS004850

This optically-isolated card connects the BMS serial port to an RS485 network, for example to run the commissioning procedure from a personal computer installed with pCO Manager. It is installed in the slot marked "serial card". Once commissioning has been completed, it can be replaced with one of the cards listed in the table.

| BMS cards | Code |
|---|---|
| Ethernet card | PCO1000WB0 |
| BACnet MS/TP 485 card | PCO1000BA0 |
| Konnex | PCOS00KXB0 |
| LON | PCO10000F0 |

### pGD1 terminal

The pGD1 graphic display is an electronic device that allows graphics management using the icon-based display as well as supporting international fonts.

### VFD inverter

CAREL VFD inverters are available in various sizes for controlling fans at constant pressure or fixed speed. See "Connecting the VFD inverter".

### pCOe expansion card

The expansion card code PCOE004850 is an electronic device, part of the pCO sistema family, designed to increase the number of inputs and outputs available on pCO controllers.

### Belimo® actuators

The MP- Bus card can be used to control up to 8 Belimo® valve and damper actuators, each where necessary with their probe or digital input, meaning significant savings in wiring required during installation.

### Analogue output module (code CONV0/10A0)

This converts the PWM signal for solid state relays (SSR) into a standard 0 to 10 Vdc or 4 to 20 mA signal. For pCOXS 1+1Mbyte models only (output Y3).

# 2. HARDWARE INSTALLATION

## 2.1 DIN rail assembly and dimensions

pCO³

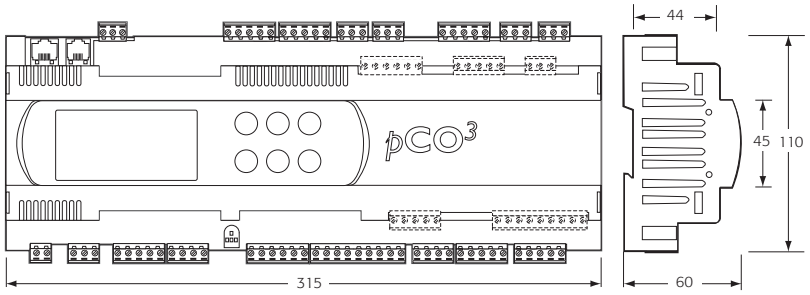



Fig. 2.a

pGD1

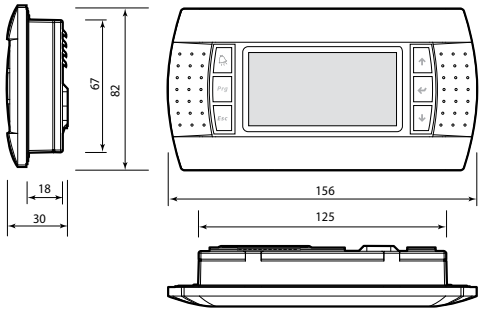



Fig. 2.b

| | pCO³ SMALL | pCO³ MEDIUM | pCO³ LARGE | pCO$^{XS}$ 1+1Mbyte |
|---|---|---|---|---|
| A (mm) | 227.5 | 315 | 315 | 140 |

## 2.2 Description of the terminals on the pCO Large

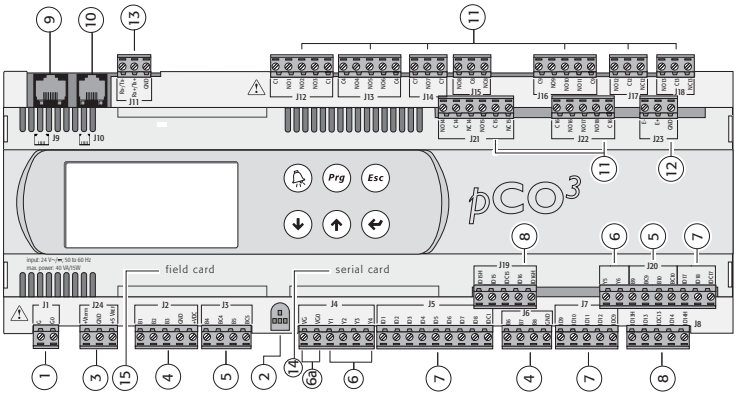



Fig. 2.c

Key

| | | |
|---|---|---|
| 1 | power supply connector | G(+), G0(-) |
| 2 | yellow power LED and 3 status LEDs | |
| 3 | additional power supply for terminal | +Vterm, GND, +5 VREF |
| 4 | universal NTC analogue inputs, 0 to 1 V, 0 to 10 V, 4 to 20 mA | B1, B2, B3, GND, +VDC and B6, B7, B8, GND |
| 5 | passive NTC analogue inputs, PT1000, ON/OFF | B4, BC4, B5, BC5 and B9, BC9, B10, BC10 |
| 6 | 0 to 10 V analogue outputs | Y1, Y2, Y3, Y4 and Y5, Y6 |
| 6a | power to optically-isolated analogue output, 24 Vac/Vdc | VG, VG0 |
| 7 | 24 Vac/Vdc digital inputs | ID1, ID2, ID3, ID4, ID5, ID6, ID7, ID8, IDC1, and ID9, ID10, ID11, ID12, IDC9 and ID17, ID18, IDC17 |
| 8 | 230 Vac or 24 Vac/Vdc digital inputs | ID13H,ID13, IDC13, ID14, ID14H e ID15H, ID15, IDC15, ID16, ID16H |
| 9 | reserved | |
| 10 | connector for the standard pCO series terminals and for downloading the application program | |
| 11 | relay digital outputs | C1, NO1, NO2, NO3, C1 and C4, NO4, NO5, NO6, C4 and C7, NO7, C7 and NO8, C8, NC8 and C9, N09, N10, NO11, C9 and NO12, C12, NC12 and NO13, C13, NC13 and NO14, C14, NC14, NO15, C15, NC15 and C16, NO16, NO17, NO18, C16 |
| 12 | reserved | E-, E+, GND |
| 13 | pLAN network connector | Rx-/Tx-, Rx+/Tx+, GND |
| 14 | cover for inserting the BMS card for supervisor and telemaintenance connection | |
| 15 | cover for inserting the RS485 or MP-Bus card | |

Tab. 2.a

| Models and features | pCO3SMALL | pCO3MEDIUM | pCO3LARGE | pCOXS 1+1Mbyte | pCOe (expansion card) |
|---|---|---|---|---|---|
| No. of analogue inputs | 5 | 8 | 10 | 4 | 4 |
| No. of digital inputs | 8 | 14 | 18 | 6 | 4 |
| No. of analogue outputs | 4 | 4 | 6 | 2 + 1 PWM | 1 |
| No. of digital outputs | 8 | 13 | 18 | 5 | 4 |

Tab. 2.b

## 2.3 Installation

### Installation instructions

Important:

Environmental conditions

Avoid assembling the pCO board and the terminal in rooms with the following characteristics:

- temperature and humidity that do not conform to the rated operating data of the product;
- strong vibrations or knocks;
- exposure to aggressive and polluting atmospheres(e.g.: sulphur and ammonia fumes, saline mist, smoke) so as to avoid corrosion and/or oxidation;
- strong magnetic and/or radio frequency interference (therefore avoid installing the units near transmitting antennae);
- exposure of the pCO board to direct sunlight and to the elements in general;
- large and rapid fluctuations in the room temperature;
- environments where explosives or mixes of flammable gases are present;
- exposure to dust (formation of corrosive patina with possible oxidation and reduction of insulation).

Positioning inside the panel

The position of the controller in the electrical cabinet must be chosen so as to guarantee correct physical separation from the power components (solenoids, contactors, actuators, inverters, ...) and the connected cables. Proximity to such devices/cables may create random malfunctions that are not immediately evident. The structure of the panel must allow the correct flow of cooling air.

Important:

Wiring instructions

Important: when laying the wiring, "physically " separate the power part from the control part. The proximity of these two sets of wires will, in most cases, cause problems of induced disturbance or, over time, malfunctions or damage to the components. The ideal solution is to house these two circuits in two separate cabinets. Sometimes this is not possible, and therefore the power part and the control part must be installed in two separate areas inside the same panel. For the control signals, it is recommended to use shielded cables with twisted wires. If the control cables have to cross over the power cables, the intersections must be as near as possible to 90 degrees, always avoiding running the control cables parallel to the power cables. CAREL highlights the following warnings:

- use cable ends suitable for the corresponding terminals. Loosen each screw and insert the cable ends, then tighten the screws. When the operation is completed, slightly tug the cables to check they are sufficiently tight;
- separate as much as possible the sensor signal, digital input and serial line cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never insert power cables (including the electrical cables) and probe signal cables in the same conduits. Do not install the sensor cables in the immediate vicinity of power devices (contactors, circuit breakers or similar);
- reduce the path of the sensor cables as much as possible, and avoid spiral paths that enclose power devices;
- avoid touching or nearly touching the electronic components fitted on the boards to avoid electrostatic discharges (extremely damaging) from the operator to the components;
- do not secure the cables to the terminals by pressing the screwdriver with excessive force, to avoid damaging the pCO controller;
- for applications subject to considerable vibrations (1.5 mm pk-pk 10/55 Hz), secure the cables connected to the pCO around 3 cm from the connectors using clamps;
- if the product is installed in industrial environments (application of the EN 61000-6-2 standard) the length of the connections must be less than 30 m;
- all the extra low voltage connections (analogue and 24 Vac/Vdc digital inputs, analogue outputs, serial bus connections, power supplies) must have reinforced or double insulation from the mains network;
- in residential environments, the connection cable between the pCO controller and the terminal must be shielded;
- there is no limit to the number of cables that can be connected to an individual terminal. The only limitation concerns the maximum current crossing each terminal: this must not exceed 8 A;
- the maximum cross-section of the cable that connected to a terminal is 2.5 mm2 (12 AWG);
- the maximum value of the twisting torque to tighten the screw on the terminal (torque tightening) is 0.6 Nm;
- installation must be performed according to the standards and legislation in force in the country where the device is used;
- for safety reasons the equipment must be housed inside an electrical panel, so that the only accessible part is the display and the keypad;
- in the event of malfunctions, do not attempt to repair the device, but rather contact the CAREL service centre.

Anchoring the pCO board

The pCO is installed on a DIN rail. To fasten the unit to the DIN rail, press it lightly against the rail. The rear tabs will click into place, locking the unit in place. Removing the unit is just as simple, using a screwdriver through the release slot to lever and lift the tabs. These are kept in the locked position by springs.

Power supply

Power supply t the pCO3 board (co controller with terminal connected): 2828 to 36 Vdc +10/-20% or 24 Vac +10/-15% 50 / 60 Hz; Maximum power P= 15 W (power supply Vdc), P= 40 VA (Vac).

- power supply other than that specified will seriously damage the system;
- a Class 2 safety transformer, rating 50 VA, must be used in the installation to supply just one pCO controller (30 VA for PCO1XSE);
- the power supply to the pCO controller and terminal (or pCO controllers and terminals) should be separated from the power supply to the other electrical devices (contactors and other electromechanical components) inside the electrical panel;
- if the power transformer secondary is earthed, check that the earth wire is connected to terminal G0. This applies to all the devices connected to the pCO;
- if more than one pCO board is connected in a pLAN network, make sure that the G and G0 references are observed (G0 must be maintained for all boards);
- a yellow LED indicates that the pCO board is powered.

## 2.4 Connection of the analogue inputs

Note: FLSTDMAHUE filters the type of analogue inputs according to the type of unit selected. The analogue inputs on the pCO board can be configured for the more common sensors on the market: NTC, PT1000, 0 to 1 V, 0 to 10 V, 4 to 20 mA. The different types of probes can be selected by setting the inputs on the screens in menu Hb: I/O configuration. See chapter 6.

### Connecting active temperature and humidity probes

The pCO controller can be connected to all the CAREL DP* series active temperature and humidity probes configured as 0 to 1 V or as 4 to 20 mA. For the temperature probes use the 4 to 20 mA or NTC configuration, as the 0 to 1 Vdc signal is limited to the range 0 to 1 V and therefore is not always compatible with the standard 10 mV/°C signal of CAREL probes (for negative temperatures and temperatures above 100 °C a probe alarm may be generated). The inputs must be pre-configured on the screens in menu Hb: I/O configuration.

| Terminals | | Probe terminals | Description |
|---|---|---|---|
| pCO | pCOXS 1+1Mbyte | | |
| GND | GND | M | Reference |
| +Vdc | +24Vdc | +G | Power supply |
| B1,B2,B3,B6,B7,B8 | B1,B2 | out H | Active humidity output |
| B1,B2,B3,B6,B7,B8 | B1,B2 | out T | Active temperature output |

Note: for connection of the serial probes see chapter 6.

### Connecting universal NTC temperature probes

All analogue inputs are compatible with 2-wire NTC sensors. The inputs must be pre-configured on the screens in menu Hb: I/O configuration.

| Terminals | | NTC |
|---|---|---|
| pCO | pCOXS 1+1Mbyte | probe wire |
| GND, BC4, BC5, BC9, BC10 | GND | 1 |
| B1, B2, B3, B4, B5, B6, B7, B8, B9, B10 | B1, B2, B3, B4 | 2 |

### Connecting PT1000 temperature probes

**Important:** pCOXS 1+1Mbyte does not allow connection of the PT1000 probe.

The pCO controller can be connected to 2-wire PT1000 sensors for all high temperature applications; the operating range is -50 to 200 °C. The inputs must be pre-configured on the screens in menu Hb: I/O configuration.

| Controller | probe 1 | probe 2 | probe 3 | probe 4 | PT1000 probe wire |
|---|---|---|---|---|---|
| pCO3 | BC4 | BC5 | BC9 | BC10 | 1 |
| | B4 | B5 | B9 | B10 | 2 |

### Connecting current pressure probes

The pCO can be connected to all CAREL SPKT****C0 series active pressure probes or any pressure probe available on the market with 4 to 20 mA signal. The inputs must be pre-configured on the screens in menu Hb: I/O configuration.

| Controller | pCO terminals | Probe |
|---|---|---|
| pCO3 | +Vdc | power supply |
| | B1, B2, B3, B6, B7, B8 | signal |

### Connecting active probes with 0 to 10 V output

**Important:** pCOXS 1+1Mbyte does not allow direct connection to active probes with 0 to 10 V output. See the pCO sistema manual for the instructions on connecting an external resistor.

The inputs must be pre-configured on the screens in menu Hb: I/O configuration.

| pCO terminals | 0 to 10 V probe wire |
|---|---|
| GND | reference |
| B1, B2, B3, B6, B7, B8 | signal |

### Remote connection of analogue inputs

The sizes of the cables for the remote connection of the analogue inputs are shown in the following table:

| Type of input | size ($mm^2$) for length up to 50 m | size ($mm^2$) for length up to 100 m |
|---|---|---|
| NTC | 0,5 | 1,0 |
| PT1000 | 0,75 | 1,5 |
| I (current) | 0,25 | 0,5 |
| V (live) | 1,5 | not recommended |

**Note:** If the product is installed in industrial environments (application of the EN 61000-6-2 standard) the length of the connections must be less than 30 m. This length shouldn't be exceeded in any case, to avoid measurement errors.

## 2.5 Connecting the digital inputs

The pCO controller features digital inputs for connecting safety devices, alarms, device status and remote switches. These inputs are all optically isolated from the other terminals. They can work at 24 Vac, 24 Vdc and some at 230 Vac.

**Note**: separate the probe signal and digital input cables as much as possible from the inductive load and power cables, to avoid possible electromagnetic disturbance

### 24 Vac digital inputs

On the pCO3 all inputs can be 24 Vac.

The following figure represents one of the most common connection diagrams for the 24 Vac digital inputs.

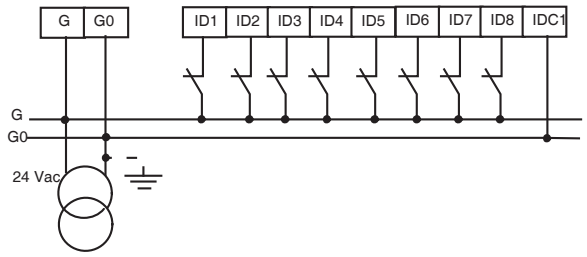



Fig. 2.d

**Note**: the connection diagrams shown in these figures, which while being the most common and convenient, do not exclude the possibility of powering the digital inputs independently from the power supply to the pCO board. In any case, the inputs only have functional insulation from the rest of the controller.

### 24 Vdc digital inputs

On the pCO3 all inputs can be 24 Vdc.

The following figure represents one of the most common connection diagrams for the 24 Vdc digital inputs.

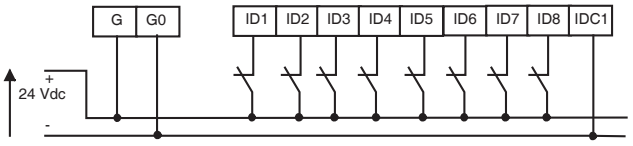



Fig. 2.e

### Connecting the digital inputs for pCOXS 1+1Mbyte

pCOXS 1+1Mbyte features up to 6 digital inputs, not optically-isolated, with voltage-free contacts, for connecting safety devices, alarms, device status, remote switches, etc.; these operate at 24 Vdc (supplied by pCOXS 1+1Mbyte) with guaranteed contact current of 6 mA.

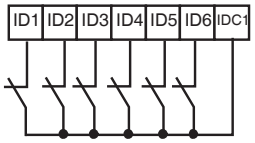



Fig. 2.f

### 230 Vac digital inputs

**Important:** pCOXS 1+1Mbyte does not allow 230 Vac digital inputs.

There are up to two groups of inputs powered at 230 Vac; each group has two inputs. The groups feature double insulation between them and can refer to different voltages. Within each group the digital inputs are not independent, however: for example the inputs ID13H and ID14H, due to the common terminal, must be powered at the same voltage to avoid dangerous short-circuits and/or the powering of lower-voltage circuits at 230 Vac. In any case, the inputs feature double insulation from the rest of the controller.

| | input |
|---|---|
| pCO3 terminals | ID13H, ID14H, ID15H, ID16H |

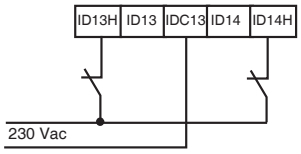



Fig. 2.g

The range of uncertainty of the switching threshold is from 43 to 90 Vac. It is recommended to use a 100 mA fuse in series with the digital inputs.

### Remote connection of digital inputs

**Important:** do not connect other devices to the digital inputs. The sizes of the cables for the remote connection of the digital inputs are shown in the following table:

| size ($mm^2$) for length up to 50 m | size ($mm^2$) for length up to 100 m |
|---|---|
| 0,25 | 0,5 |

**Note**: if the product is installed in industrial environments (application of the EN 61000-6-2 standard) the length of the connections must be less than 30 m. This length shouldn't be exceeded in any case, to avoid measurement errors.

## 2.6 Connecting the analogue outputs

### Connecting the 0 to 10 V analogue outputs

The pCO controller provides 0 to 10 V optically-isolated analogue outputs, powered externally at 24 Vac/Vdc. The table below shown summarises the distribution of the analogue outputs according to the version available.

| Model | Terminals | Reference |
|---|---|---|
| pCO small | Y1, Y2, Y3, Y4 | VG0 |
| pCO medium | Y1, Y2, Y3, Y4 | VG0 |
| pCO large | Y1, Y2, Y3, Y4,Y5, Y6 | VG0 |
| pCOXS 1+1Mbyte | Y1, Y2 | G0 |

## 2.7 Connecting the digital outputs

The pCO controller features digital outputs with electromechanical relays. For ease of installation, the common terminals of some of the relays have been grouped together.

### Electromechanical relay digital outputs

The relays are divided into groups, according to the insulation distance. Inside each group, the relays have just basic insulation and thus must have the same voltage (generally 24 V ac or 110 to 230 Vac). Between the groups there is double insulation and thus the groups can have different voltages. There is also double insulation from the rest of the controller.

| Model | Reference for relays with same insulation | | | |
|---|---|---|---|---|
| | Group 1 | Group 2 | Group 3 | Group 4 |
| pCO small | 1 to 7 | 8 | | |
| Type of relay | Type A | Type A | | |
| pCO medium | 1 to 7 | 8 | 9 to 13 | |
| Type of relay | Type A | Type A | Type A | |
| pCO large | 1 to 7 | 8 | 9 to 13 | 14 to 18 |
| Type of relay | Type A | Type A | Type A | |
| pCOXS 1+1Mbyte | 1 to 3 | 4 | 5 | |
| Type of relay | Type A | Type A | Type A | |

| Relay ratings | SPDT, 2000 VA, 250 Vac, 8 A resistivi | |
|---|---|---|
| Approval | UL873 | 2.5 A resistive, 2 A FLA, 12 A LRA, 250 Vac, C300 pilot duty (30000 cycles) |
| | EN 60730-1 | 2 A resistive, 2 A inductive, cosφ=0.6, 2(2)A (100000 cycles) |

### Remote connection of digital outputs

The sizes of the cables for the remote connection of the digital outputs are shown in the following table:

| AWG | Size ($mm^2$) | Current (A) |
|---|---|---|
| 20 | 0,5 | 2 |
| 15 | 1,5 | 6 |
| 14 | 2,5 | 8 |

If the product is installed in industrial environments (application of the EN 61000-6-2 standard) the length of the connections must be less than 30 m.

**Note**: for further details and for the connection diagrams, see the pCO sistema manual (+030220335).

## 2.8 Connectingthefaninverterviaanalogueinput

To connect the inverter for fan control to the serial network, see paragraph 6.7. Alternatively, the fan inverter can be connected even if the MP-Bus card is used to control Belimo® actuators. Connect the modulating analogue output on the pCO (e.g. Y4), the alarm signal digital input (e.g. ID2) and the enabling signal digital output (e.g. NO1). The inputs must be pre-configured on the screens in menu Hb: I/O configuration. The figure illustrates the connection to the Carel VFD-NXL; for other inverters, see the corresponding manual.

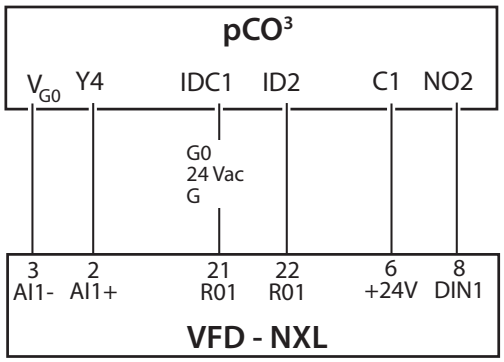



Fig. 2.h

**Note**: for further details and for the complete connection diagrams, see the dedicated VFD_NXL manual (+030220720) and the programming manual code +030220725.

## 2.9 Connecting serial devices with Modbus/ Belimo® protocol

See paragraphs 6.6 and 6.8. The serial probes must be installed according to the following diagram, and require the field serial card PCO100FD10 to be inserted in the special slot ("Field-Bus"). The power supply must be 24 Vac. To connect Belimo® devices, use card PCO100MPB0. The following figure shows two alternative connection possibilities.

## 2.10 Remote terminal with pLAN network

If the pCO boards are connected in a pLAN network, the terminal can be installed up to 50 m away, using a telephone cable, while if using a shielded twisted pair cable, TCONN6J000 and separate power supply, it can be installed up to 500 m away.

**Note**: if the terminal is used in a residential environment the cable must always be shielded. The maximum distance between the pCO and the user terminal is shown in the following table:

| type of cable | power supply distance | power supply |
|---|---|---|
| telephone | 50 m | taken from pCO (150 mA) |
| AWG24 shielded cable | 200 m | taken from pCO (150 mA) |
| AWG20/22 shielded cable | 500 m | separate power supply via TCONN6J000 |

The maximum distance between two pCO3 controllers with AWG20/22 shielded cable is 500 m.

**Note**: for further details and for the connection diagrams, see the pCO sistema manual (+030220335).

## 2.11 Connection diagrams

The following paragraphs show the functional and wiring diagrams for the air handling unit (AHU) managed by the various pCO boards, according to the corresponding default parameters.

Where possible, the symbols used refer to the following standards:

- UNI 9511-1;
- UNI 9511-3.

### pCO3 Small

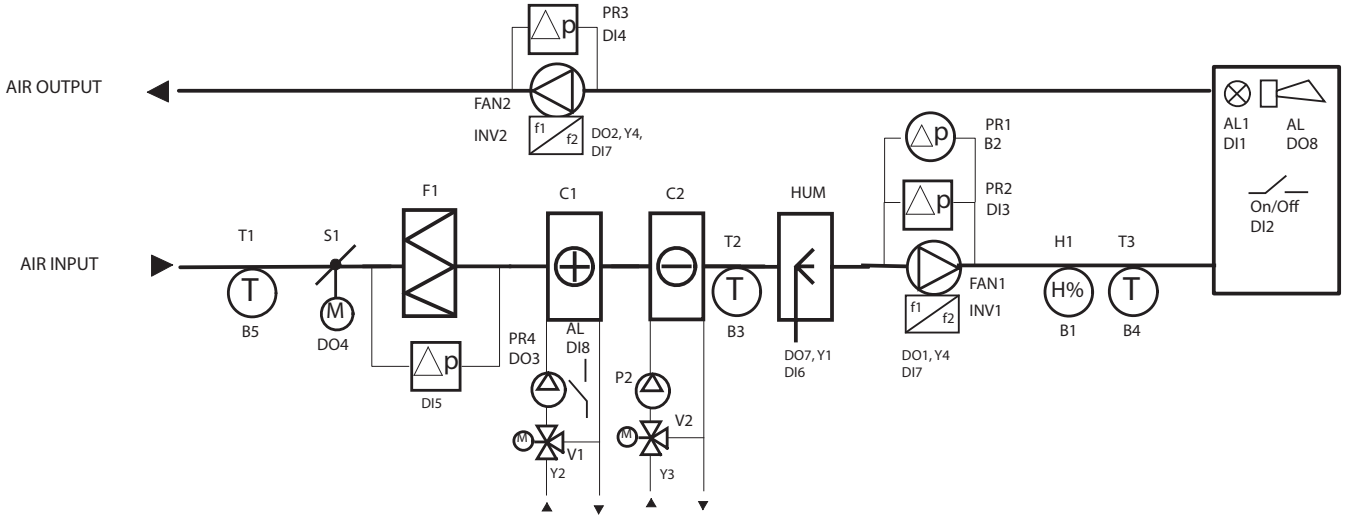



Fig. 2.i

| AI | Analogue inputs | AO | Analogue outputs | P1 | Preheating coil pump |
|---|---|---|---|---|---|
| B1 | Supply humidity | Y1 | Humidifier | P2 | Cooling coil pump |
| B2 | Differential pressure outlet air | Y2 | Preheating valve | T | Temperature probe |
| B3 | Frost protection temperature | Y3 | Cooling valve | H | Humidity probe |
| B4 | Supply temperature | Y4 | Supply fan | INV1 | Supply fan inverter |
| B5 | Outside temperature | | | INV2 | Return fan inverter |
| **DI** | **Digital inputs** | **DO** | **Digital outputs** | **C1** | **Preheating coil** |
| DI1 | Generic alarm | DO1 | Supply fan | C2 | Cooling coil |
| DI2 | Remote ON/OFF | DO2 | Return fan | PR | Differential pressure switch/probe |
| DI3 | Supply air flow alarm | DO3 | Preheating pump 1 | HUM | Humidifier |
| DI4 | Return air flow alarm | DO4 | Outside air damper | F1, F2 | Filters |
| DI5 | Supply air filter alarm | DO5 | Filter alarm (not indicated) | AL | General alarm |
| DI6 | Humidifier alarm | DO7 | Humidifier | AL1 | General alarm |
| DI7 | Supply (return) fan inverter alarm | DO8 | General alarm | S1 | Outside damper |
| DI8 | Preheating pump thermal overload alarm | | | | |

Tab. 2.c

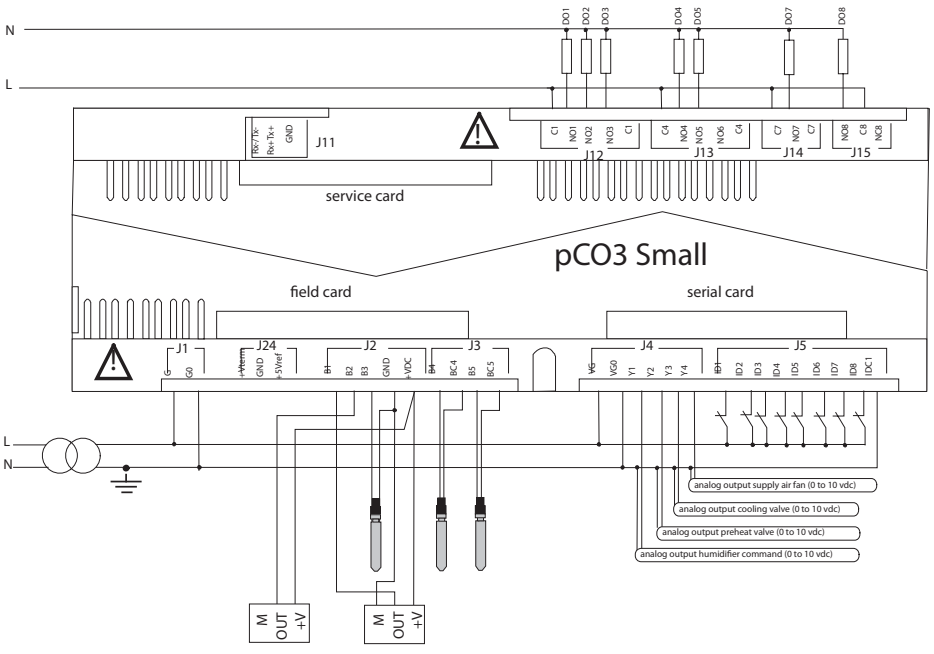



Fig. 2.j

**pCO3 Medium**

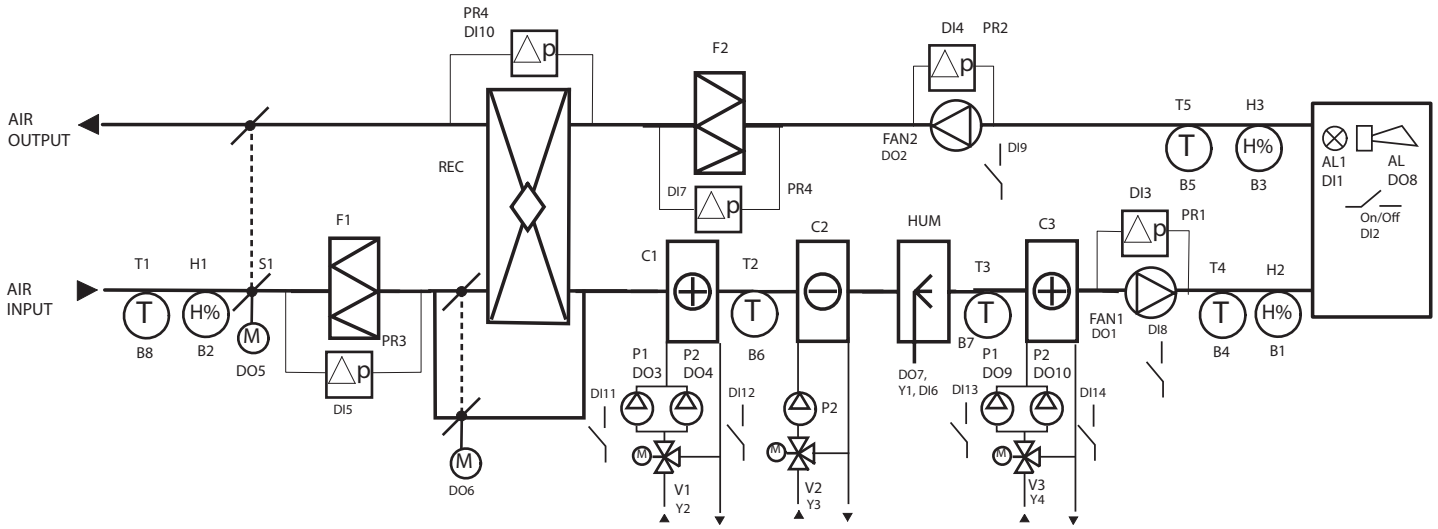



Fig. 2.k

| AI | Analogue inputs | AO | Analogue outputs | P1 | Preheating pump 1 |
|---|---|---|---|---|---|
| B1 | Supply humidity | Y1 | Humidifier | P2 | Cooling pump |
| B2 | Outside humidity | Y2 | Preheating valve | T | Temperature probe |
| B3 | Return humidity | Y3 | Cooling valve | H | Humidity probe |
| B4 | Supply temperature | Y4 | Reheating valve | C1 | Preheating coil |
| B5 | Return temperature | DI | Digital inputs | C2 | Cooling coil |
| B6 | Frost protection temperature | DI1 | Generic alarm | PR | Differential pressure switch/probe |
| B7 | Saturation temperature | DI2 | Remote ON/OFF | HUM | Humidifier |
| B8 | Outside temperature | DI3 | Supply air flow alarm | F1, F2 | Filters |
| DO | Digital outputs | DI4 | Return air flow alarm | AL | General alarm |
| DO1 | Supply fan | DI5 | Supply air filter alarm | AL1 | General alarm |
| DO2 | Return fan | DI6 | Humidifier alarm | S1 | Outside damper |
| DO3 | Preheating pump 1 | DI7 | Return filter alarm | | |
| DO4 | Preheating pump 2 | DI8 | Supply fan thermal overload alarm | | |
| DO5 | Outside air damper | DI9 | Return fan thermal overload alarm | | |
| DO6 | Bypass damper | DI10 | Dirty heat recovery unit alarm | | |
| DO7 | Humidifier | DI11 | Preheating pump 1 thermal overload alarm | | |
| DO8 | General alarm | DI12 | Preheating pump 2 thermal overload alarm | | |
| DO9 | Reheating pump 1 | DI13 | Reheating pump 1 thermal overload alarm | | |
| DO10 | Reheating pump 2 | DI14 | Reheating pump 2 thermal overload alarm | | |

Tab. 2.d

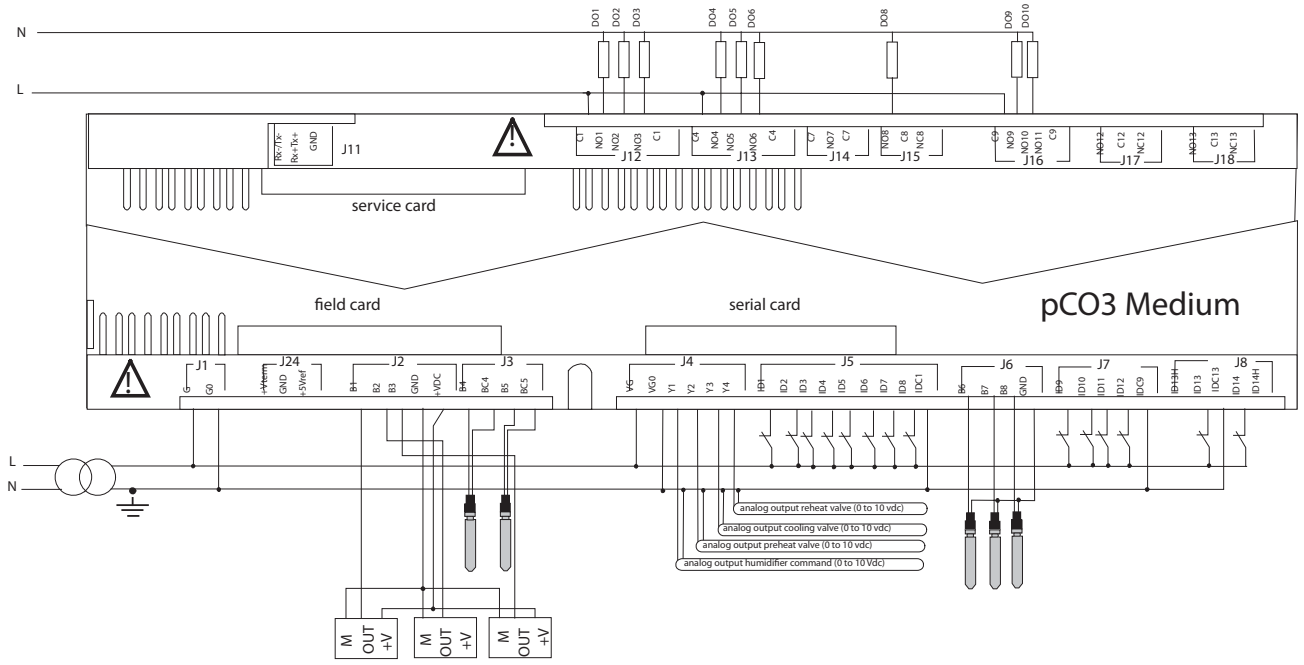



Fig. 2.l

## pCO3 Large

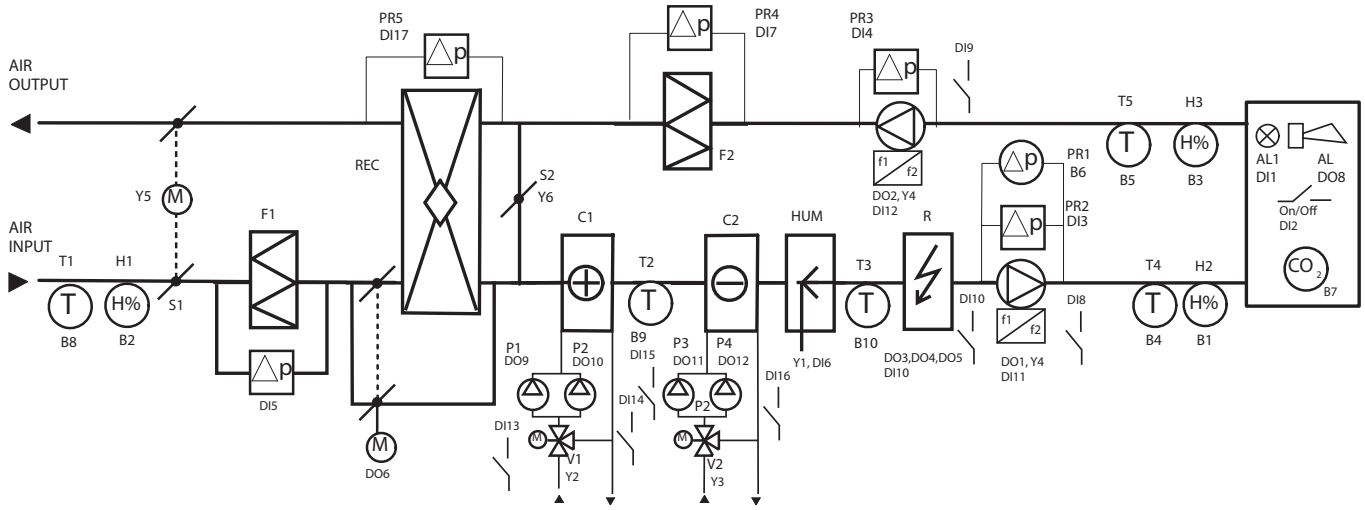



Fig. 2.m

| AI | Analogue inputs | AO | Analogue outputs | P1…4 | Pumps |
|---|---|---|---|---|---|
| B1 | Supply humidity | Y1 | Humidifier | T | Temperature probe |
| B2 | Outside humidity | Y2 | Preheating valve | H | Humidity probe |
| B3 | Return humidity | Y3 | Cooling valve | C1 | Preheating coil |
| B4 | Supply temperature | Y4 | Supply fan | C2 | Cooling coil |
| B5 | Return temperature | Y5 | Outside/exhaust air damper | PR | Differential pressure switch/probe |
| B6 | Differential pressure outlet air | Y6 | Mixing damper | HUM | Humidifier |
| B7 | CO2 probe | DI | Digital inputs | F1, F2 | Filters |
| B8 | Outside temperature | DI1 | Generic alarm | AL | General alarm |
| B9 | Frost protection temperature | DI2 | Remote ON/OFF | AL1 | General alarm |
| B10 | Saturation temperature | DI3 | Supply air flow alarm | S1 | Outside/exhaust damper |
| DO | Digital outputs | DI4 | Return air flow alarm | S2 | Mixing damper |
| DO1 | Supply fan | DI5 | Supply air filter alarm | R | Heater |
| DO2 | Return fan | DI6 | Humidifier alarm | | |
| DO3 | Reheat heater 1 | DI7 | Return air filter alarm | | |
| DO4 | Reheat heater 2 | DI8 | Supply fan thermal overload alarm | | |
| DO5 | Reheat heater 3 | DI9 | Return fan thermal overload alarm | | |
| DO6 | Bypass damper | DI10 | Reheating heater thermal overload alarm | | |
| DO7 | Humidifier | DI11 | Supply fan inverter alarm | | |
| DO8 | General alarm | DI12 | Return fan inverter alarm | | |
| DO9 | Preheating pump 1 | DI13 | Preheating pump 1 thermal overload alarm | | |
| DO10 | Preheating pump 2 | DI14 | Preheating pump 2 thermal overload alarm | | |
| DO11 | Cooling pump 1 | DI15 | Cooling pump 1 thermal overload alarm | | |
| DO12 | Cooling pump 2 | DI16 | Cooling pump 2 thermal overload alarm | | |
| | | DI17 | Dirty heat recovery unit alarm | | |

Tab. 2.e

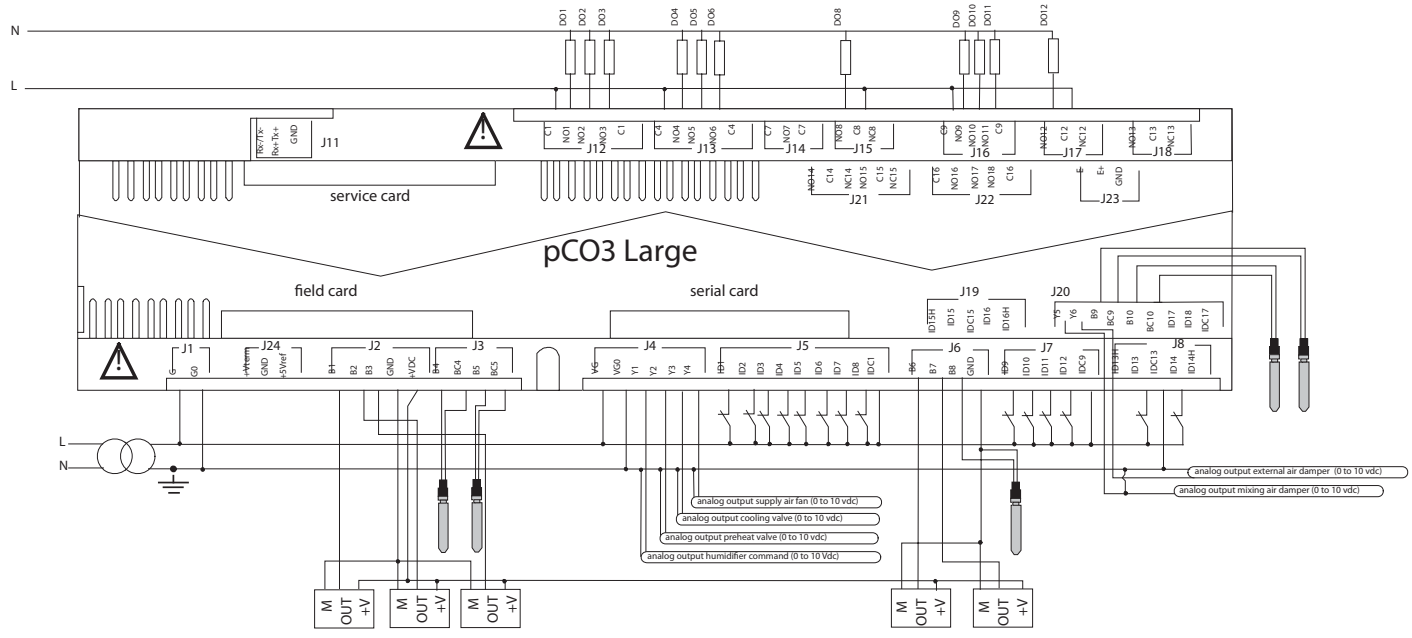



Fig. 2.n

**pCOXS 1+1Mbyte (pCO1XSE)**

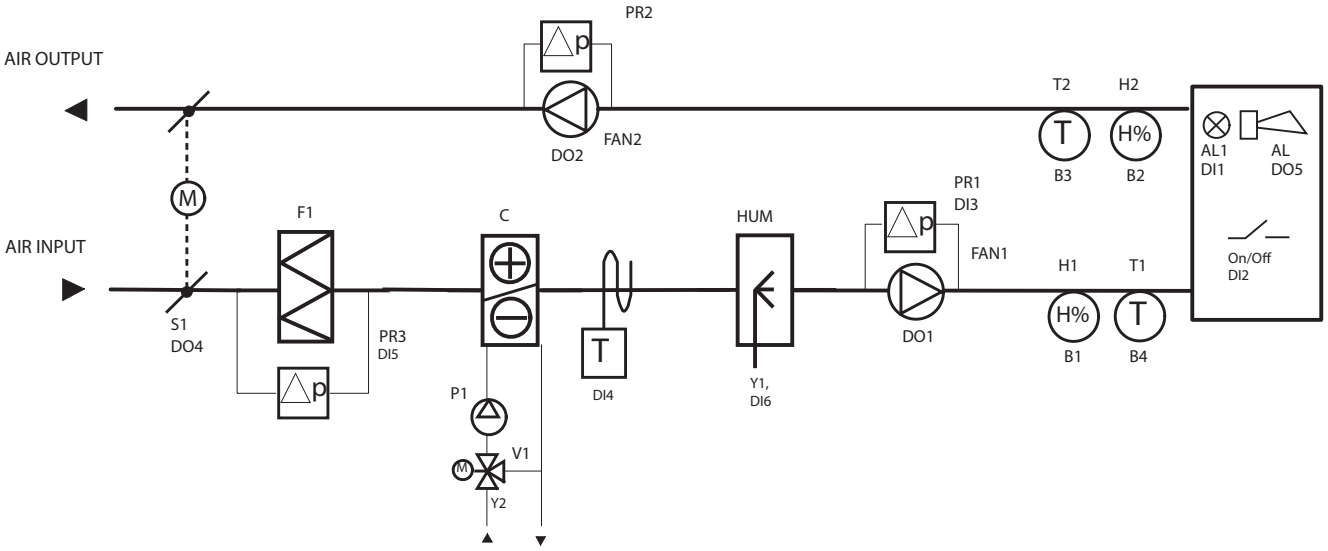



Fig. 2.o

| AI | Analogue inputs | AO | Analogue outputs | P1 | Heating/cooling coil pump |
|---|---|---|---|---|---|
| B1 | Supply humidity | Y1 | Humidifier | T | Temperature probe |
| B2 | Return humidity | Y2 | Heating/cooling valve | H | Humidity probe |
| B3 | Return temperature | DO | Digital outputs | C | Heating/cooling coil |
| B4 | Supply temperature | DO1 | Supply fan | PR | Pressure switch |
| DI | Digital inputs | DO2 | Return fan | HUM | Humidifier |
| DI1 | Generic alarm | DO3 | - | F1 | Filter |
| DI2 | Remote ON/OFF | DO4 | Outside/exhaust damper | AL | General alarm |
| DI3 | Supply air flow alarm | DO5 | General alarm | AL1 | General alarm |
| DI4 | Frost protection alarm | | | S1 | Outside/exhaust air damper |
| DI5 | Supply air filter alarm | | | FAN | Fan |
| DI6 | Humidifier alarm | | | | |

Tab. 2.f

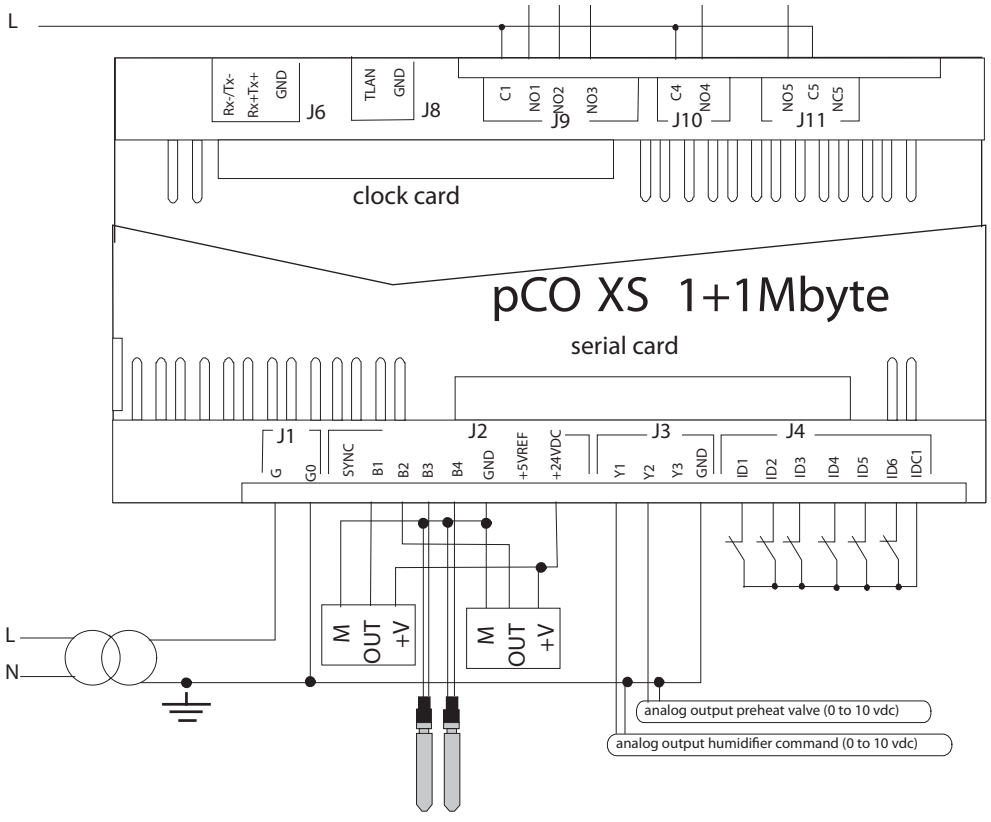



Fig. 2.p

# 3. USER INTERFACE

## 3.1 Graphic terminal

The pGD1 terminal, in the wall or panel-mounted versions, or included with the pCO board (built-in), features the display and the keypad, featuring 6 buttons that, pressed alone or in combination, are used to configure and program the controller.


Fig. 3.a

| BUTTON | DESCRIPTION |
|---|---|
| Alarm | - Display the list of active alarms<br>- Reset alarms with manual reset |
| ***Prg*** | Access the main menu |
| ***Esc*** | Return to previous screen |
| Up / Down | Scroll screen displayed or increase / decrease value |
| Enter | - Switch from display to programming parameters<br>- Confirm value and return to the list of parameters |

Tab. 3.a

## 3.2 Display and keypad

During normal operation, the graphic display shows the time, date and selected unit, two selectable system variables, the active device icon and unit control status.

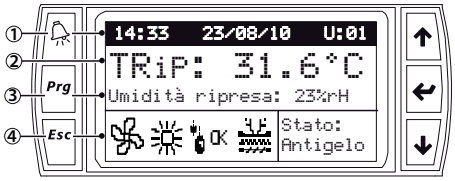



Fig. 3.b

Key

1 Time/date/unit displayed
2 Variable 1 on display
3 Variable 2 on display
4 Active devices
5 Control status

Note:

- the graphic display can be shared across a pLAN network with a maximum of 8 pCO controllers. See screen F. Board switch;
- the variables on the display can be selected on screen Gfc01.

| ICON | DESCRIPTION |
|---|---|
| | At least 1 fan on |
| OK | No preheating coil/ reheating/ cooling active |
| OK | Humidifier not active / no dehumidification |
| | Cooling coil active for cooling |
| | Cooling coil active for dehumidification |
| | At least 1 preheating or reheating coil active for heating or frost protection |
| | Humidifier active |
| | Frost prevention (see par. 8.16) |
| | Heat recovery unit active |
| FC FH | Freecooling or freeheating active |

Tab. 3.b

Note: if the unit is in freecooling or freeheating, the OK and OK icons are displayed next to the corresponding icon to indicate that no coil or humidifier is active.

Stati di regolazione

| | Text on display | Unit status |
|---|---|---|
| OFF | OFFbyALR | Off due to alarm |
| | OFFbyBMS | Off from BMS (*) |
| | OFFdaFSC | Off from time band |
| | OFFbyDIN | Off from digital input |
| | OFFbyKEY | Off from keypad |
| | Wait | Software checks in progress |
| ON | Unit ON | Unit on |
| | Manual | Manual actuator override (see Menu Gg) |
| | Comfort (Autocomfort) | Comfort mode (from time band) |
| | Pre-Comf (Autoprec) | Pre-comfort mode (from time band) |
| | Economy (Autoecon) | Economy mode (from time band) |
| | Protect | Protection mode |
| | Startup | Start-up phase |
| | Shutdown | Shutdown phase |
| | Purging | Purging phase |
| | Manual | Manually device override |

Tab. 3.c

(*) BMS = Building Management System

## 3.3 Programming mode

The parameters can be modified using the front keypad. Access differs according to the level: user parameters (accessible without password), Service (password=PW1) and Manufacturer (password = PW2). Press Prg to access the main menu.

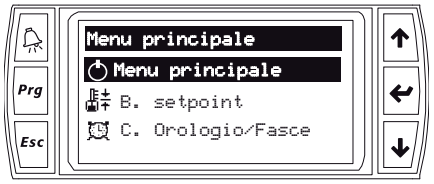



Fig. 3.c

Main menu icons

| | | | | | |
|---|---|---|---|---|---|
| A. | | On/Off unit | E. | | Data logger |
| B. | | Setpoint | F. | | Board switch |
| C. | | Clock/scheduler | G. | | Service |
| D. | | Input/Output | H. | | Manufacturer |

Tab. 3.a

Note: the control remembers the last category of parameters accessed and goes directly to this category when next accesses.

### Set/display user parameters

The user parameters (A…F) are all the parameters accessible without password, and include the following categories:

A. ON/OFF Unit: set the ways the unit is switched ON and OFF;
B. Setpoint: display the current temperature and humidity set points (B01), set the temperature and humidity set point for cooling and heating modes;
C. Clock/scheduler: set the current time and date (C01), the daily time bands (C02) with weekly programming, holiday periods (C03), special days (C04), days when daylight saving starts and ends (C05);
D. Input/output: display the inputs and outputs, indicating the position of the terminals based on the markings screen printed on the pCO boards and the values measured by the probes (D01 to D29);
E. Data logger: display up to 50 alarms with progressive numbering, activation time and date, supply and return recorded;
F. Board switch: the terminal can be shared by up to 8 pCO controllers.

Browsing

1. press Esc one or more times to move to the standard display;
2. press Prg to enter the main menu tree;
3. select the category of parameters (A…H) with Up / Down;
4. press Enter to enter the first screen: the cursor flashes at the top left: press Down to move to the following screen (e.g. B01 B02);

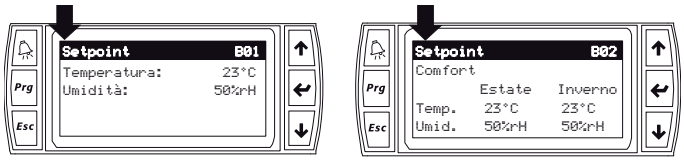



Fig. 3.d

5. press Enter to set the first parameter on the screen: the cursor flashes in front of the value being set; press Up / Down to change the value and confirm by pressing Enter. This moves automatically to the next parameter.

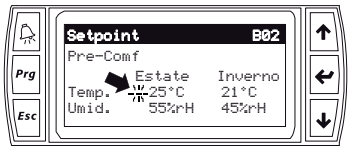



Fig. 3.e

6. press Up/Down and Enter to set this parameter or Enter to move to the next parameter;
7. once having concluded the settings for the parameters on the screen, press Enter to access the screen, Esc to move to the higher level and continue settings parameters on other screens, following steps 3 to 7.

Note: modifiable text values are shown on the display in UPPER CASE.

EXAMPLE 1: Setting the current time/date.

1. press Esc one or more times to move to the standard display;
2. press Prg: the display shows the main menu;
3. press UP/DOWN to move to category C. Clock/scheduler;
4. press Enter to display the first screen: C01;
5. press Enter to modify the current time using UP/DOWN;
6. confirm by pressing Enter and move to the minutes;
7. repeat steps 5 and 6 three times to modify the date (day / month / year);
8. press Esc to exit the parameter setting procedure.


Fig. 3.f

Note: the clock must be enabled on screen Hc20 if the clock card is installed on the pCOXS.

EXAMPLE 2: Setting the time bands.

1. press Esc one or more times to move to the standard display;
2. press Prg: the display shows the main menu;
3. press UP/DOWN to move to category C. Clock/scheduler;
4. press Enter and UP/DOWN to display the second screen C02: "Enable bands" and choose "YES";
5. choose the day of the week, the time each band starts (F1, F2, F3, F4) and the corresponding operating mode;
6. if necessary copy the settings from one day to another.


Fig. 3.g

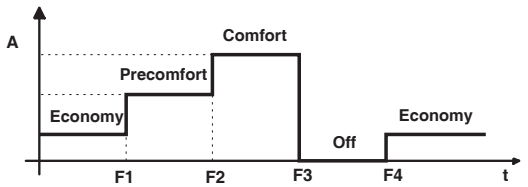



Fig. 3.h

Note: the set point for Comfort, Precomfort and Economy modes can be set on screens B02, B03, B04 respectively.

## Setting the Service parameters

The Service parameters (letter G) concern:

1. parameters modifiable without password:
   a. Change language;
   b. Information: application, BIOS and BOOT version;
   c. Summer/winter: summer/winter changeover mode (keypad, digital input, BMS, auto, water temperature);
   d. Working hours: read device operating hours;
2. parameters accessible with password PW1 (default =1234);
   e. BMS configuration: choose the BMS communication protocol (CAREL, LON, Modbus), communication speed (baud rate), network address and activate commissioning service (Ge03);
   f. Service settings: include device operating hour settings, probe calibration, temperature control and change password (PW1);
   g. Manual management: procedure for manually activating the devices so as to prepare for commissioning.

Procedure: The setting/display procedure is similar to the one for the user parameters, however password PW1 must be entered to access category G parameters.

Note:

- if no button is pressed, after around 5 min the display automatically returns to standard mode;
- the service password PW1 can be changed on screen Gfd03;
- once entered, the password remains active for a certain time, after which it needs to be entered again.

Setting the Manufacturer parameters

The Manufacturer parameters (letter H) are only accessible after entering **password PW2 (default =1234),** and concern:

a. Selection and configuration of the devices on the AHU;
b. I/O configuration: configuration of inputs and outputs, in other words assignment of the position of the probes (e.g. supply, return, room temperature), digital inputs (e.g. remote ON/OFF, summer/winter changeover, alarms), digital outputs (e.g. fans, pumps, heaters) and analogue outputs (e.g. fans, dampers, humidifier);
c. Factory settings: setting of temperature and humidity control probes, minimum and maximum limits for opening the dampers, fan activation delay, coil activation delay on unit startup, travel times of three position valves, temperature limits for activation of preheating, reheating and cooling coils, delay time for activation of alarms and inverter (VFD) configuration parameters for the supply and return fan. See the chapters on commissioning and description of the functions.

Procedure: The setting/display procedure is similar to the one for the user parameters, however password PW2 must be entered to access category H parameters.

Important: the Manufacturer parameters can only be modified when the controller is OFF.

Note:

- the manufacturer password PW2 can be changed on screen Hd03;
- entering the manufacturer password PW2 also allows access to the parameters protected by service password PW1.

# 4. DESCRIPTION OF THE

Press the Prg button to access the main menu. Select the category of parameters using UP/ DOWN and confirm by pressing Enter. If the password is required, enter each figure using the Up/Down buttons and confirm by pressing Enter. After a certain time, if no button is pressed, the password will need to be entered again.

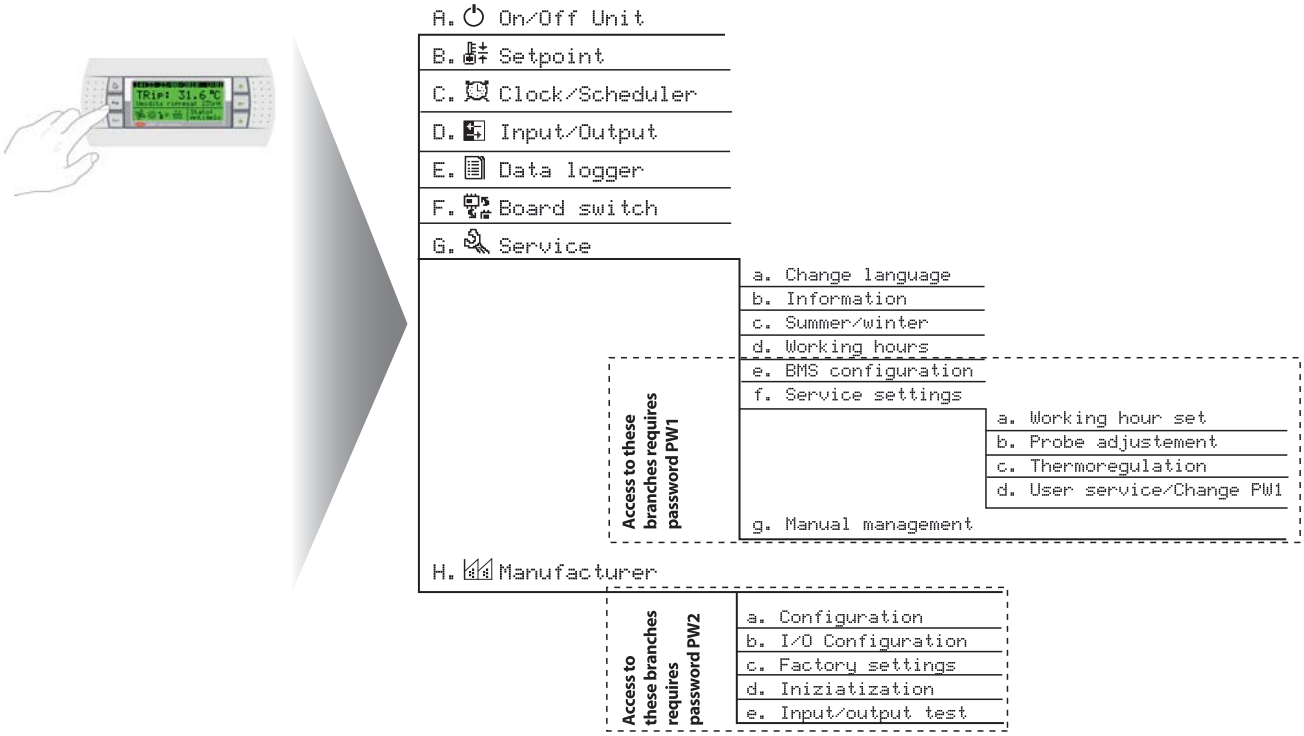



Fig. 4.a

## 4.1 A. On/Off Unit

There are two possible cases:

- if time bands are disabled (C.Clock/scheduler ➔ C02.Enable scheduler), the unit can only be switched on from the keypad in Comfort mode. The temperature and humidity set points defined for this mode will then be used indefinitely for control. (B.Setpoint ➔ B02.Comfort);
- if time bands are enabled, the unit will be able to follow the time band settings if "Auto" is selected (A.On/Off Unit ➔ A01.Auto). On the display, in the special area, the operating mode will be determined by the time band setting (C02) and preceded by the prefix "Auto". If a different operating mode is selected, the unit switches to manual mode.

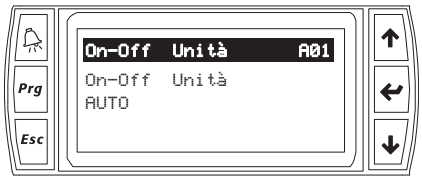



Fig. 4.b

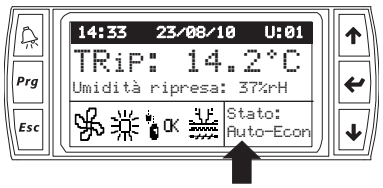



Fig. 4.c

**Note:** see the "Functions" chapter for the complete description of the On/Off function.

### Manual mode

If time bands are enabled (C.Clock/scheduler ➔ C02.Enable scheduler), and the unit is started from the keypad (A01.On/Off Unit), the following operating modes can be selected:

1. Auto: see previous paragraph;
2. Manual mode: the unit is forced to operate in one of the available operating modes (OFF, Economy, Pre-comfort, Comfort), for a time ranging from 30 minutes to 8 hours. Automatic operation can resume after this period by enabling reset (A.On/Off Unit ➔ Enable auto-resume). Naturally the temperature and humidity set points must have previously been set in the corresponding menu (B02.Setpoint➔Comfort; B03.Setpoint➔Pre-comfort; B04.Setpoint➔Economy).

The display shows the operating mode in the relevant area, e.g. Comfort.

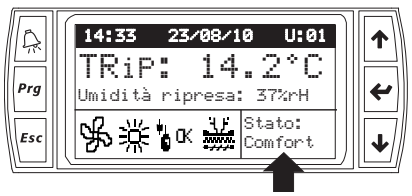



Fig. 4.d

## 4.2 B. Setpoint

The first screen B01 displays the current temperature and humidity set points. The temperature set point displayed considers any set point compensation function operating (see the "Functions" chapter). If time bands are enabled (C: Clock/scheduler ➔ C02: Enable scheduler), different temperature and humidity set points can be set for Economy, Pre-comfort and Comfort modes (B: Setpoint ➔Comfort, Pre-comf, Economy) according to the season, summer or winter. In total, then, 6 temperature set points and 6 humidity set points can be set (screens B02, B03, B04). If time bands are not enabled, only the set point for comfort mode can be set. Economy mode is used to set a reduced set point (e.g. night-time), for lower energy consumption, and the unit can be switched from Comfort to Economy mode via a digital input, if enabled (screen Ha18); Pre-comfort mode is half-way between Economy and Comfort.

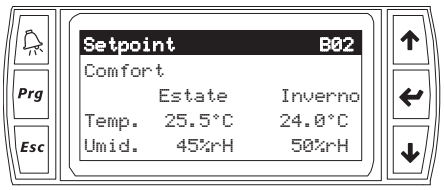



Fig. 4.e

## 4.3 C. Clock/Scheduler

The following values can be set:

- current time and date;

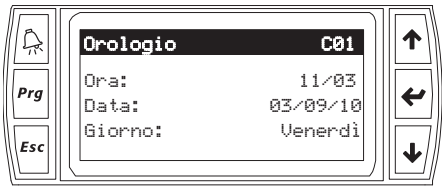



Fig. 4.f

- enable and program the time bands. The time bands are programmed on a weekly basis, with four time bands available for each day of the week, starting from times F1, F2, F3, F4. Each time band can be assigned an operating mode, choosing between OFF, Economy, Pre-Comfort and Comfort. The settings can be copied from one day to another;

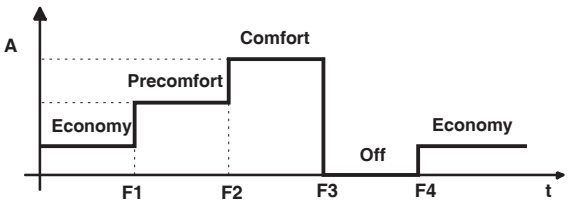



Fig. 4.a

Key:

| | | | |
|---|---|---|---|
| F1 to F4 | Start time band 1 to 4 | t | time |
| A | Operating mode | | |

Note: the set points can be set independently for each operating modes;

- holidays: three holiday periods can be set, with start and end sate and operating mode (Economy, Pre-comfort, Comfort).


Fig. 4.g

- special days: up to six special days can be selected, defining the operating mode;

Note: the "auto" option involves normal operation based on the time band settings.


Fig. 4.h

- enable daylight saving, selecting the start and end date and time for the period. A transition time can be set, between 0 and 240 minutes.

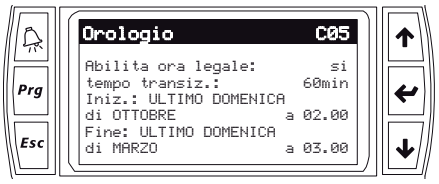



Fig. 4.i

Nota: se è abilitato il setpoint da ingresso digitale (maschere Ha18 e Hb24: doppio setpoint), è possibile agendo sull'ingresso passare dalla modalità Comfort a Economy. In tal caso scompaiono le maschere C02, C03, C04 di programmazione delle fasce orarie, delle vacanze e dei giorni speciali.

## 4.4 D. Input/Output

Note: after configuring the software (see the corresponding chapter) menu D is used to see what inputs and outputs have been configured.
The first row on the screens in menu D indicates the type, input or output, analogue or digital, to make browsing simpler.

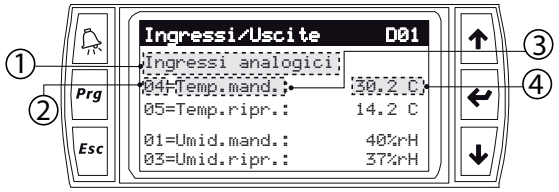



Fig. 4.j

| | | | |
|---|---|---|---|
| 1 | Type of input | 3 | Description of the input |
| 2 | Terminal number on board | 4 | Value measured |

- analogue inputs: temperature, humidity, differential pressure and air quality probes.
- digital inputs: status of pressure switches/flow switches connected to the supply and return filters (open/closed), flow switches connected to supply and return air fans, safety thermostats for pumps/fans, heaters, alarms on the inverter connected to the supply/return air fan, dirty heat recovery unit alarm, remote On/Off controls, change season summer/winter;


Fig. 4.k

- display % air quality request and purge request;
- digital outputs: activate/deactivate the supply/return air fan, defrost heater, heat recovery unit, humidifier, general alarm, bypass damper, reheating heaters, pumps;

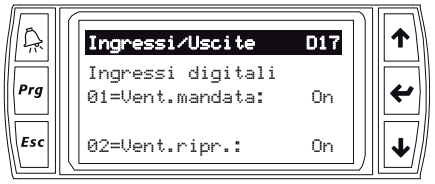



Fig. 4.l

Note: the status of the digital input (ON/OFF) also depends on whether its configured as normally open (NO) or normally closed (NC) in menu Hb

- analogue outputs: control signals for modulating actuators, supply/return air fan, dampers, humidifier, valves. See the list of parameters.

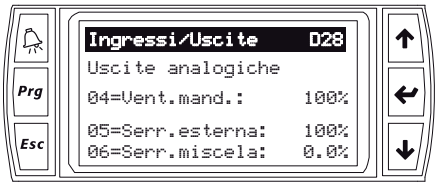



Fig. 4.m

Important: the menu D only shows the inputs/outputs that have been enabled, i.e. position ≠ 0 assigned in menu Hb. See paragraph 6.3.

## 4.5 E. Data logger

From the main menu (E.) the logged alarms can be displayed in sequence: the alarm is saved with its number in the log, the time, date, code, description and the supply (TS) and return (TR) temperature measured when the alarm was activated; to cancel the alarms, access the Service menu with password (G.Service ➔f.Service settings➔d.User service/Change PW1 ➔ Delete data logger). The "Alarm" button, on the other hand, is used to mute the buzzer (if fitted), display currently active alarms and reset them (obviously these remain in the log) and at the end of the list go directly to the data logger.


Fig. 4.n

Note:
- also see the chapter on alarms;
- the alarm log cannot be accessed directly by pressing the alarm button .

## 4.6 F. Board switch

The main menu (F.) displays the graph of controllers connected in the pLAN network. To switch from one controller to another, scroll to the "go to unit" field and enter the address of the unit to connect to: as soon as the connection has been established, the address is shown in the "unit address" field and on the graph.


Fig. 4.o

## 4.7 G. Service

The main menu (G.) provides access to a submenu divided into two parts: the first (a,b,c,d) is not password-protected and can be used to display and set the following:

- G.a. Change language: select one of the languages loaded in the application program (Italian, English…) and then on the following screen enable language selection when starting;
- G.b. Information: information relating to the application code (and version), on the first screen available, while the second shows the information concerning the pCO board hardware.

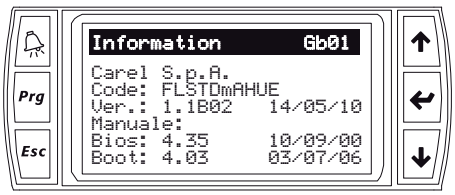



Fig. 4.p

- G.c. Summer/Winter: the season can be selected via:
  - Keypad: the following screen is used to select the current season: summer or winter;
  - Digital input: summer/winter changeover depends on a previously configured digital input (Hb24);
  - BMS: season changeover is managed by the supervisor;
  - Keypad/BMS: the season changeover control is the most recent between keypad or BMS;
  - AUTO: if "FIX DAYS" is selected on the following screen, the start summer and start winter dates can be set, while if on the other hand AUTO is selected, as well as the start summer and start winter dates temperature thresholds can be set to change season automatically. See paragraph 8.7;
- G.d. Working hours: displays the operating hours of the main devices on the AHU (fans, humidifier, pumps, heaters) that may require periodical maintenance.

Note: from this point on in the submenu, password PW1 must be entered to browse the screens.

- G.e. BMS configuration: this section is used to set all the parameters required for connection to a supervisory system, such as the protocol, communication speed and address. The BMS offline alarm can be enabled to signal communication failures during operation, and finally the commissioning service can be activated, requiring connection to a computer running the pCO manager program.
- G.f.a. Working hour set: used to set the operating hour threshold for the main devices on the unit: fans, humidifier, pumps and heaters. When the operating hours are exceeded a "warning" is shown that must be reset by accessing this screen. See the chapter on alarms.
- G.f.b. Probe adjustment: used to set an offset to add too or subtract from the probe reading in question (temperature, humidity, differential pressure, air quality). Once having confirmed the offset value (Cal), pressing automatically updates the value of the corresponding probe (shown to the side).
- G.f.c. Thermoregulation: this branch includes all the parameters relating to temperature control and that can be modified during installation or service, except for the manufacturer parameters, which are located in branch H.c;
  - Main mask information: these are the two variables available on the standard display;
  - Temperature/humidity limits set: these are the minimum and maximum limits for setting the corresponding set points (B.Setpoint  B02.Comfort, B03.Pre-comfort, B04.Economy) in Economy, Pre-comfort and Comfort modes, both summer and winter;
  - For the explanation of the following screens relating to the control algorithms, see the "Functions" chapter.
  - G.f.d. User service/change PW1: this is used to:
  - load the unit configuration saved (H.Manufacturer  d.Initialization 01.Save configuration) at the end of the software configuration procedure (see chapter 6);
  - delete the alarm log;
  - change the Service password (PW1);
- G.g. Manual management: is used to switch the individual devices on the unit from automatic to manual. For the digital outputs the options are ON (100%) or OFF (0%), while for analogue outputs the possibilities vary from 0 to 100%. This selection bypasses control, but not the alarm thresholds, so as to safeguard unit safety; in general, this operation is used to test the individual actuators during commissioning (see chapter 7).

Note: if a device is managed manually, the control status on the display is "manual".

## 4.8 H. Manufacturer

The main menu (H.) provides access to the manufacturer submenu, after entering the corresponding password PW2.

### Ha: Configuration

The configuration is the first step in defining the type of air handling unit. Unlike other software that allows selection of a preloaded model that comes closest to the actual one, then making any slight changes required, this application program uses the following identification procedure:

1. hard copy drawing of the air handling unit;
2. choice of the type of actuators installed on the unit in the configuration menu.

Note: below is a brief description of the menu: the detailed software configuration procedure is described in chap. 6.

Ha01:
- fan type: supply fan only or supply and return air fans; in the latter case an activation delay can be set for the return fan after the supply fan (Hc06);
- coil type: none, cool+pre+reheat, cool, heat, cool + preheat; cool + reheat, heating/cooling, heating/cooling + reheat;
- enable humidifier and heat recovery unit;

Note: if the heating/cooling is used, enable the heat / cool output on Hb42 for changeover based on demand and the switching delay set on Hc12;

Ha02:
- damper type: fresh air only (On/Off or modulating), fresh air+mixing, fresh air+mixing+exhaust, fresh air (modulating) +exhaust;
- enable freecooling and freeheating by temperature or enthalpy;
- enable air quality control;

Ha03:
- select the type of fan control: see paragraph 8.14;

Ha04: type of fan alarms: see paragraph 8.14;

Ha05: select preheating device:
- modulating valve: control with 0 to 10 Vdc input: once selected, a minimum value > 0 V and a maximum value <10 V can be set;
- floating valve: the floating valve motor travel time needs to be defined (Hc08): 1 to 3200 s;
- heaters: see paragraph 8.13;
- select probe used for humidification: paragraph 8.4;

Ha06: select cooling device:
- modulating valve;
- floating valve: the floating valve motor travel time needs to be defined (Hc08): 1 to 3200 s;
- direct expansion: from 1 to 3 steps can be selected. The demand managed by the steps is divided into equal parts based on the number of steps selected. On the cooling cascade screen (Gfc20) set the % of demand managed by freecooling (if enabled) and the remaining % managed by the cooling coil;
- type of dehumidification: see paragraph 8.4.

Ha07: type of heating/cooling coil:
- modulating valve;
- floating valve;
- steps: similar to direct expansion described for Ha06.

Ha08:
- select reheating device: see the selection of the preheating device;
- select function of reheating coil:

3. compensation: this involves heating the air after having dehumidified it using the cooling (reheating) coil or after having humidified the air using the adiabatic humidifier;
4. integration: in heating cascade control, the reheating coil supplements the preheating coil. The action of the reheating coil and the preheating coil may overlap (Gfc22);
5. compensation +integration: both functions are performed.

Ha09: enable coil pumps and water flow control alarms.
See paragraph 8.12;

Ha10/Ha11/Ha12: cooling / preheating / reheating coil pumps. See paragraph 8.12;

Ha13: type of humidifier: see paragraph 8.4.

Ha14: enable and select type of heat recovery unit: see paragraph 8.10.

Note: assign the analogue/digital outputs to the actuators in the I/O configuration menu. Also set the maximum and minimum values for the modulating bypass damper.

Ha15: air quality and enable purging.
See paragraph 8.15.

Ha16: frost protection. See paragraph 8.17.

Ha17: ON/OFF from digital input and BMS. See paragraph 8.1.

Ha18: setpoint from digital input. See paragraph 8.1.

Ha19: setpoint offset by analogue input. See paragraph 8.2.

Ha20, Ha21, Ha22, Ha23: auxiliary regulation loops. See paragraph 8.18.

Ha24: Protocols. Protocols can be set:

f. for the BMS serial:
   - Winload: the Winload protocol must be selected in order to activate the Commissioning service, i.e. for setting the parameters from pCO Manager. The RS485/USB converter code CVSTDUMOR0 and RS485 serial interface (PCOS004850) are required;
   - BMS: select between the boards listed in chapter 1.

g. for the Fbus serial:
   - Belimo: see paragraph 6.8.
   - Modbus master: connect the optically-isolated RS485 card (code PCO100FD10).

Ha25: Modbus master settings
Set the parameters for the Modbus master protocol:
- Baudrate or transmission speed: 1200/2400/4800/9600/19200 bit/s;
- Stop bits: 1 or 2;
- Parity: even or no;
- Timeout: 100 to 5000 ms: this is the time after which if communication is interrupted the device offline error is shown: serial probe or VFD (Variable Frequency Drive = inverter).

Ha26: Modbus master settings
Number of pCOe expansion cards and serial probes.

Ha30: enable probes and digital inputs from supervisor
See paragraph 6.9.

Ha39… Ha56: screens relating to the VFD Carel inverter
See the Commissioning chapter.

## Hb: I/O configuration

See paragraph 6.3.

## Hc: Factory settings

See the "Software configuration" and "Functions" chapters.

# 5. SOFTWARE INSTALLATION

The following systems can be used to update and install the FLSTDMAHUE application on the pCO controller board:
• pCO Manager (with Winload communication protocol);
• SmartKey.

## 5.1 pCO Manager

On all CAREL 16 bit pCO sistema controllers (see the pCO sistema manual) the resident software can be updated using a PC. For this purpose, CAREL provides the pCOLoad program and a serial converter with RS485 output (code CVSTDUTLF0) to be connected to the pCO. The special driver also needs to be installed on the PC, also provided by CAREL. The program is included in the installation of the "1Tool" program suite or with the pCO Manager program, downloadable separately from http://ksa.CAREL.com, under "download support software utilities". The installation, as well as the program, also includes the user manual. The pCO controller can be connected directly to the PC via the RS485 serial port used for the "pLAN" connection or using the BMS serial port with optional RS485 serial card used for the "supervisor" connection.

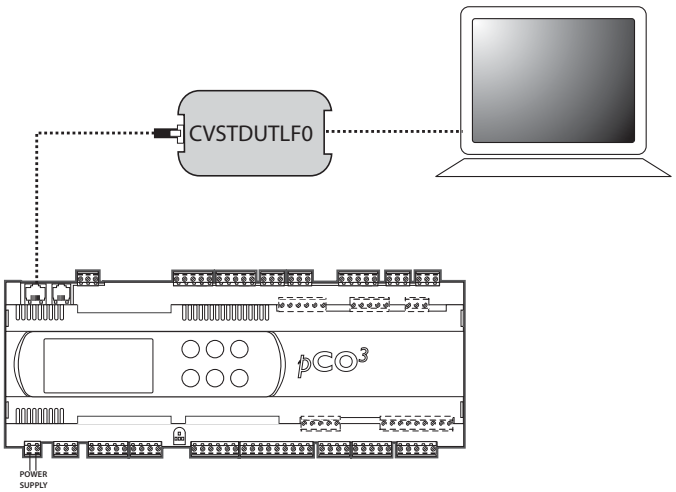



Fig. 5.a

It must be underlined that updating the BOOT Updating the BOOT is generally NOT RECOMMENDED by CAREL; during production CAREL always loads the BOOT required for the correct operation of the unit. Only in very special cases will CAREL ask the user to update the BOOT. The BIOS can only be loaded via the pLAN serial connection. When updating the application and the BIOS, the pCO operating mode switches to low level. In this special mode, the logged data cannot be downloaded to the PC nor can the application be loaded in compressed format. To return the unit to normal communication mode, reset the pCO board. If uploading the BOOT or BIOS files only, the other application files then need to be uploaded again. The consequences of interruption to the upload procedure depend on the instant this occurs. In any case, the upload needs to be repeated. If pCOLoad cannot connect to the pCO, a Smart Key must be used to download the BIOS and any other operating application (e.g.: pCO functional test). This refreshes the pCO memory, allowing connection to pCOLoad.

### Commissioning Tool (1tool)

Commissioning tool is configuration and real-time monitoring software used to check the operation of an application installed on a pCO, for commissioning, debugging and maintenance. This tool can be used to set the configuration parameters, set the values of volatile and permanent variables, save the trend in the main values of the unit to a file, manually manage the unit I/Os using a simulation file and monitor/restore the alarms on the unit where the device is installed.
The configuration functions available on the commissioning tool allow the designer to decide which variables will be monitored/logged/plotted or monitored by event, to organise the variables into categories, and to choose the set of configuration parameters.

### Support files

Following development of the application, 1tool generates various files during compilation; these include two that are required for commissioning:
< *applicationName*>.2CF (descriptive of variables)
<*applicationName*>.2CD (descriptive of categories and access profiles)
As well as these files, the <*applicationName*>.DEV file that contains the pre-defined set of unit parameters can also be managed. When the commissioning procedure is complete, or for configuration or monitoring, the user can generate the following files:
<*applicationName*>.2CW (descriptive of categories, access profiles, monitoring groups)
<*CommissioningLogFileName*>.CSV (commissioning log file, containing the data on the variables recorded during monitoring);
For the configuration phase of the commissioning procedure, the following files must be available: .2CF, 2CD and where necessary .DEV, which can be imported and exported.
For the monitoring phase, as well as the files mentioned above, the .2CW file with the definition of the working environment may be required. The commissioning log file is an output file only.

#### Connection modes

Each controller has three serial ports (0, 1 and 2), each with its own default protocol:

| Port | Default protocol | Description |
|---|---|---|
| Serial 0 | pLAN | Connection to terminal and pLAN network |
| Serial 1 | BMS | Supervisor connection |
| Serial 2 | FieldBus | Field device connection |

There are two modes for commencing local communication between pCO Manager and the controller:
1. Activate the WinLoad protocol on the required port;
2. On BMS only, irrespective of the protocol set on the pCO, simply connect pCO Manager and from "Connection settings" select SearchDevice = Auto (BMS). In this case it will take around 15-20 seconds to go online.

#### Memory limits

The periodical monitoring of the application variables is limited to a maximum of 250 WORDS, freely selectable from the entire memory available to the application. The virtualisation of application variables is limited to a maximum of 50 WORDS, selectable from the entire memory available to the application. There are no address limits for "one-shot" read/write of individual variables: all memory addresses reserved for the application in all types of memory available on the pCO can be used: X memory, T memory, P memory, E memory.

Note: for further details on installing and updating the software on the pCO controller, see the online help for the pCO Manager program.

## 5.2 SmartKey

The SMARTKEY programming key is used to emulate the operation of the parallel programming key on pCO models where this is not available (pCOXS, pCO3), with the exception of the BOOT, which is not loaded by the SMARTKEY. Specifically, the key can clone the contents of one pCO and then download the data to another identical pCO via the terminal telephone connector (the pLAN must be disconnected). This function is obviously available for all pCO controllers, even those with parallel key. In addition to this mode, the key can transfer the data logged on a series of pCO devices and download them to the PC. From the PC, using the "SMARTKEY PROGRAMMER", the key can be configured to run certain operations: retrieve logs, program applications, program BIOS, etc. For further details see the online help for the "SMARTKEY PROGRAMMER" and the SMARTKEY instruction sheet.

Per maggiori dettagli riferirsi all'Help online del programma "SMARTKEY PROGRAMMER" e al foglio istruzioni di SMARTKEY.

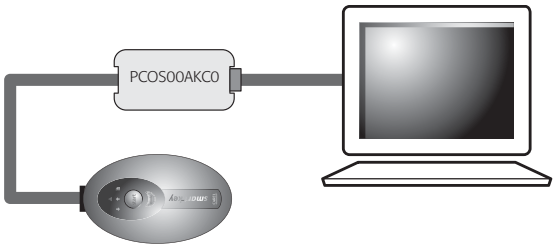



Fig. 5.b

Note: for further details on installing and updating the software on the pCO controller, see the online help for the pCO Manager program.

## 5.3 Setting the terminal address

The address of the terminal can be set in the range from 0 to 32; addresses between 1 and 32 are used by the pLAN protocol, while address 0 identifies the Local terminal protocol, used for non-graphic point-to-point connections and to configure the pCO controller. The default address is 32. The address of the terminal can only be set after having powered the terminal via the RJ12 connector. To access configuration mode press ↑, ↓ and ↵ together for at least 5 seconds; the terminal will display a screen similar to the one shown below, with the cursor flashing in the top left corner::

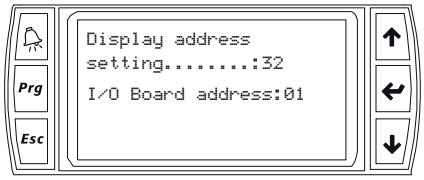



Fig. 5.c

To modify the address of the terminal ("Display address setting") carry out the following operations in sequence.

1. Press ↵ once: the cursor will move to the "Display aderse setting" field;
2. Select the desired value using ↑ nd ↓, and confirm by pressing ↵ again;
3. If the value selected is different from the value saved, the following screen will be displayed and the new value will be saved to the permanent memory on the display.

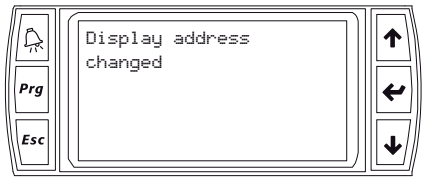



Fig. 5.d

If the address field is set to 0, the terminal communicates with the pCO board using the Local terminal protocol and the "I/O Board address" field disappears, as it no longer has any meaning. To modify the list of the terminals (private and shared) associated with a pCO board, carry out the following operations in sequence:

4. Enter configuration mode (see above) pressing ↑, ↓ and ↵ together for at least 5 seconds.
5. Press ↵ twice: the cursor will move to the "I/O Board address" field.
6. Select the address of the pCO board in question and confirm by pressing ↵.

Then the pCO controller will start the configuration procedure, opening a screen similar to the following.

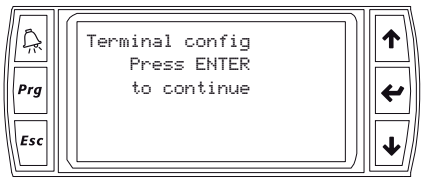



Fig. 5.e

7. Press ↵ again: the configuration screen will be shown, similar to the one below.

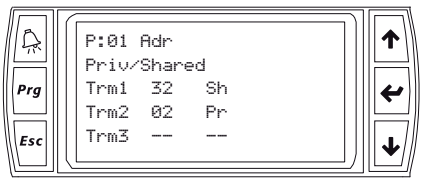



Fig. 5.f

8. Configure the terminals as desired. Pressing ↵ moves the cursor from one field to the next, while ↑ and ↓ change the value of the current field. P:xx represents the address of the selected pCO board (in the example in the figure, this is board 1).
9. To exit the configuration procedure and save the data, select "Ok?", set "Yes" and confirm by pressing ↵. During the configuration procedure, if the terminal remains inactive (no button is pressed) for more than 30 seconds, the pCO board automatically interrupts the procedure without saving any changes.

⚠ Important: if during operation the terminal detects inactivity on the pCO board it is connected to, the display is cancelled and a message similar to the one shown below is displayed.

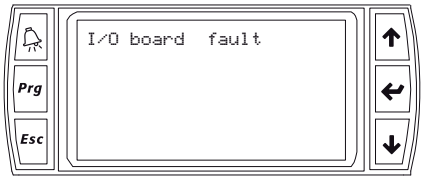



Fig. 5.g

If the terminal detects inactivity of the entire pLAN network, that is, it does not receive any messages from the network for 10 seconds consecutively, the display is cancelled completely and the following message is shown:

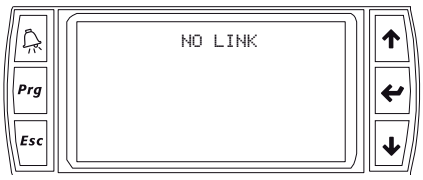



Fig. 5.h

# 6. SOFTWARE CONFIGURATION

**Important**: some of the following operations are often carried out during installation, as the devices are connected in the field and configured. The software configuration procedure includes these steps:

1. Select devices (screens Ha01, Ha02);
2. Configure devices (screens Ha03, …, Ha30);
3. Assign inputs/ outputs (menu Hb);
4. Set device control parameters (menu Hc);

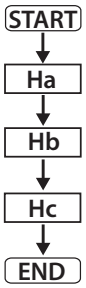



Fig. 6.a

## 6.1 Select devices (Ha)

Once the application program has been installed and the electrical connections have been completed (see the "Hardware installation" chapter), the operations required for commissioning the controller depend on the type of air handling unit, and involve these steps:

1. Check correspondence between the design AHU - it's recommended to refer to a complete hard copy drawing - and the AHU managed by the pCO board with the default parameters. See the "Hardware installation" chapter;

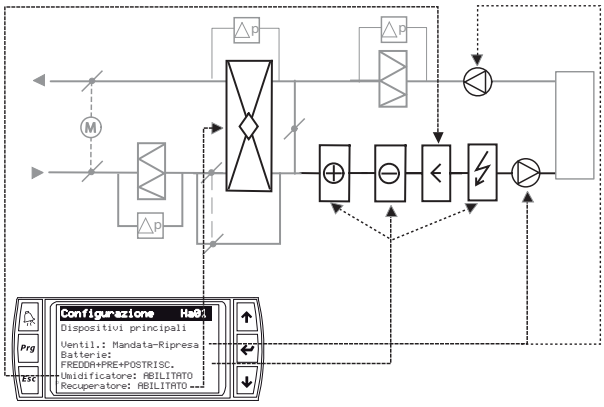



Fig. 6.b

**Note**: selecting the devices on screens Ha01 and Ha02 defines the AHU and determines which of the following screens or configuration menus for the inputs and outputs (Hb) are displayed

2. If the design AHU is similar to the default AHU, try adding or removing devices or probes until achieving a complete match;
3. If the design AHU is very different from the unit managed by the default parameters, delete all the configured analogue and digital inputs and outputs. To do this access menu H. Manufacturer ➔b.I/O configuration ➔Hb99. Positions deletes to delete the default configuration and then enter the new configuration;
4. Access menu H. Manufacturer ➔a.Configuration to select:
   - Ha01: the main devices on the AHU (number of fans, number of heating coils, enable humidifier, enable heat recovery unit;
   - Ha02: type of dampers, enable freecooling/freeheating (by temperature/ enthalpy), air quality control…
5. Again in menu H. Manufacturer ➔a.Configuration: configure the type of devices: modulating valve, floating valve, heaters, no. of pumps for each coil, type of air quality control and other functions such as purging, type of frost protection, etc. See the table of parameters for the list of devices on the "Ha" screens that are displayed according to the selections made on Ha01 and Ha02.

EXAMPLE: the default configuration of the pCO Large includes a heat recovery unit with bypass damper. If the AHU is designed for an application in which neither freecooling nor the possibility of frost forming on the heat recovery unit are envisaged, this device may not exists and therefore can be excluded, thus freeing an output. Simply access the "Configuration" menu (screen Ha14) and disable the bypass damper.

## 6.2 Configure devices (Ha)

From screen Ha03 on the selected devices, type of control and corresponding probes are configured. These settings must be coherent both with the electrical connections made and the software loaded on the pCO board during installation.

| | |
|---|---|
| Ha03) | fan type: with inverter or on/off control, see paragraph 8.14; |
| Ha04) | fan alarms: thermal overload and/or flow; |
| Ha05) | preheating device: floating valve, modulating valve, heaters; |
| Ha06) | cooling device: floating valve, modulating valve, floating valve, direct expansion steps; |
| Ha07) | heat/cool coil; |
| Ha08) | reheating device: floating valve, modulating valve, heaters; |
| Ha08) | reheating operation for compensation, integration, integration + compensation; |
| Ha09): | enable pumps on cooling, preheat and reheating coils; |
| Ha13): | type of humidifier: isothermal or adiabatic, ON/OFF or modulating; |
| Ha14): | type of heat recovery unit: cross-flow, run-around coil or modulating heat wheel; |
| Ha14): | bypass damper fitted; |
| Ha15): | air quality control type: P+I or proportional only; |
| Ha15): | air quality probe type: CO2, VOC, CO2+VOC; |
| Ha15): | enable purging; |
| Ha16): | frost protection type: from probe, thermostat, probe+thermostat; |
| Ha17): | enable unit ON/OFF from digital input or BMS; |
| Ha18): | enable change set point from comfort to economy from digital input; |
| Ha19): | enable offset on setpoint from analogue input; |
| Ha19): | activate auxiliary control loop; |
| Ha24): | select protocol on Fieldbus serial and BMS serial; |
| Ha25): | communication speed, parity and timeout for Modbus master protocol; |
| Ha26): | number of pCOe expansion cards and number of serial probes connected; |
| Ha29): | configure VFD inverter parameters; |
| Ha30): | enable probes and digital inputs from supervisor. |

## 6.3 Assign inputs/outputs (Hb)

In the menu H. Manufacturer ➔b.I/O configuration:

1. select the type and position of the analogue and digital inputs and the analogue and digital outputs. For active probes also set the minimum limit attributed to the minimum input value and the maximum limit attributed to the maximum input value;
2. Check the configuration in menu D. Inputs/outputs and the input readings;
3. Test the outputs (He01…) to verify correct wiring and operation of the devices.

Note:

- the controller automatically identifies which terminals are free and automatically proposes the first available positions, according to the type of input (e.g. NTC, PT1000, 0 to 1 V, 0 to 10 V, 4 to 20 mA) based on the hardware features of the pCO board used;
- some screens are only shown if the corresponding device has been enabled and configured;

**Important**:
- a device is only enabled if the position of the corresponding analogue or digital output is not zero;
- a probe or digital input is only enabled if the position of the corresponding input ≠0, or is selected from the serial probes (T1…T6, H1…H6, A1…A6), probes on the pCOe expansion card (E1…E8) or supervisor probes (S1…S4). See paragraphs 6.5 and 6.6;
- if certain inputs or outputs are not shown on the assignment screens as expected, see the parameters table, which highlights the conditions required for displaying a screen.

## CONFIGURABLE INPUTS

| ANALOGUE | | DIGITAL | |
|---|---|---|---|
| Ref. | Description | Ref. | Description |
| Hb01 | Supply temperature | Hb24 | Remote On/Off |
| Hb02 | Return temperature | Hb24 | Summer/winter |
| Hb03 | Outside temperature | Hb24 | Set point from DI |
| Hb04 | Room temperature | Hb25 | Generic alarm |
| Hb05 | Supply humidity | Hb25 | Serious alarm |
| Hb06 | Return humidity | Hb25 | Frost protection alarm |
| Hb07 | Outside humidity | Hb26 | Supply filter 1 alarm |
| Hb08 | Room humidity | Hb26 | Supply filter 2 alarm |
| Hb09 | Supply diff. pressure | Hb26 | Return filter alarm |
| Hb10 | Return diff. pressure | Hb27 | Supply flow switch |
| Hb11 | Frost protection temperature | Hb27 | Return flow switch |
| Hb12 | Saturation temperature | Hb28 | Humidifier alarm |
| Hb13 | CO2 probe | Hb28 | Supply inverter alarm |
| Hb14 | VOC probe | Hb28 | Return inverter alarm |
| Hb15 | Exhaust temperature | Hb29 | Supply fan 1 thermal overload |
| Hb16 | Cooling or heating/cooling coil temperature | Hb29 | Supply fan 2 thermal overload |
| Hb17 | Preheating coil temperature | Hb29 | Return fan 1 thermal overload |
| Hb18 | Reheating coil temperature | Hb29 | Return fan 2 thermal overload |
| Hb19 | Auxiliary probe 1 | Hb30 | Cooling pump 1 thermal overload |
| Hb20 | Auxiliary probe 2 | Hb30 | Preheat pump 1 thermal overload |
| Hb21 | Auxiliary probe 3 | Hb30 | Reheat pump 1 thermal overload |
| Hb22 | Auxiliary probe 4 | Hb31 | Cooling pump 2 thermal overload |
| Hb23 | Set point offset from AIN | Hb31 | Preheat pump 2 thermal overload |
| | | Hb31 | Reheat pump 2 thermal overload |
| | | Hb32 | Cooling pump flow switch |
| | | Hb32 | Preheat pump flow switch |
| | | Hb32 | Reheat pump flow switch |
| | | Hb33 | Dirty heat recovery unit alarm |
| | | Hb33 | Preheat heater overload |
| | | Hb33 | Reheat heater overload |
| | | Hb34 | Dirty filter alarm |
| | | Hb34 | Door contact open |
| | | Hb34 | Smoke-fire alarm |

Tab. 6.a

| POSSIBLE OPTIONS | | POSSIBLE OPTIONS | |
|---|---|---|---|
| pCOXS 1+1Mbyte | 1 to 4 | pCOXS 1+1Mbyte | 1 to 6 |
| pCO3SMALL | 1 to 5 | pCO3SMALL | 1 to 8 |
| pCO3MEDIUM | 1 to 8 | pCO3MEDIUM | 1 to 12 |
| pCO3LARGE | 1 to 10 | pCO3LARGE | 1 to 14 |
| pCOe (not PT1000) | pCOe1: E1 to E4 | pCOe | pCOe1: E1 to E4 |
| | pCOe2: E5 to E8 | | pCOe1: E5 to E8 |
| Serial probes | Temperature: T1 to T6; A1 to A6 | Belimo® | M1 to M8 |
| | Humidity: H1 to H6; A1 to A6 | BMS variables | S1 to S4 |
| Belimo® | M1 to M8 | | |
| BMS variables | S1 to S4 | | |

Tab. 6.b

## CONFIGURABLE OUTPUTS

| ANALOGUE | | DIGITAL | |
|---|---|---|---|
| Ref. | Description | Ref. | Description |
| Hb51 | Supply fan | Hb35 | Supply fan 1 |
| Hb52 | Return fan | Hb35 | Return fan 1 |
| Hb53 | Outside damper | Hb35 | Humidifier |
| Hb54 | Mixing damper | Hb36 | Supply fan 2 |
| Hb55 | Exhaust damper | Hb36 | Return fan 2 |
| Hb56 | Bypass damper | Hb37 | Supply fan star delta |
| Hb57 | Humidifier | Hb38 | Return fan star delta |
| Hb58 | Preheating valve | Hb39 | Bypass damper |
| Hb59 | Cooling valve or heating/cooling | Hb39 | Heat wheel/heat recovery unit pump |
| Hb60 | Modulating preheating heater | Hb40 | General alarm |
| Hb61 | Reheating valve | Hb40 | Serious alarm |
| Hb62 | Modulating reheating heater | Hb40 | Minor alarm |
| Hb63 | Heat wheel | Hb41 | Unit status (ON/OFF) |
| Hb64 | Auxiliary 1 | Hb41 | Filter alarm |
| Hb65 | Auxiliary 2 | Hb41 | Heat recovery unit defrost heater |
| Hb66 | Auxiliary 3 | Hb42 | Heat/cool |
| Hb67 | Auxiliary 4 | Hb43 | Cooling pump 1 |
| | | Hb43 | Preheat pump 1 |
| | | Hb43 | Reheat pump 1 |
| | | Hb44 | Cooling pump 2 |
| | | Hb44 | Preheat pump 2 |
| | | Hb44 | Reheat pump 2 |
| | | Hb45 | Floating valve opening, cooling-heating/cooling |
| | | Hb45 | Floating valve opening, preheat |
| | | Hb45 | Floating valve opening, reheat |
| | | Hb46 | Floating valve closing, cooling-heating/cooling |
| | | Hb46 | Floating valve closing, preheat |
| | | Hb46 | Floating valve closing, reheat |
| | | Hb47 | Cooling-heating/cooling step 1 |
| | | Hb47 | Cooling-heating/cooling step 2 |
| | | Hb47 | Cooling-heating/cooling step 3 |
| | | Hb48 | Preheat heater 1 |
| | | Hb48 | Preheat heater 2 |
| | | Hb48 | Preheat heater 3 |
| | | Hb48 | Preheat heater 4 |
| | | Hb49 | Reheat heater 1 |
| | | Hb49 | Reheat heater 2 |
| | | Hb49 | Reheat heater 3 |
| | | Hb49 | Reheat heater 4 |
| | | Hb50 | Auxiliary loop 1 On/Off |
| | | Hb50 | Auxiliary loop 2 On/Off |
| | | Hb50 | Auxiliary loop 3 On/Off |
| | | Hb50 | Auxiliary loop 4 On/Off |

Tab. 6.c

| POSSIBLE OPTIONS | | POSSIBLE OPTIONS | |
|---|---|---|---|
| pCOXS 1+1Mbyte | 1 to 3 (output 3 PWM) | pCOXS 1+1Mbyte | 1 to 5 |
| pCO3SMALL | 1 to 4 | pCO3SMALL | 1 to 8 |
| pCO3MEDIUM | 1 to 4 | pCO3MEDIUM | 1 to 13 |
| pCO3LARGE | 1 to 6 | pCO3LARGE | 1 to 18 |
| pCOe | pCOe1: E1 | pCOe | pCOe1: E1 to E4 |
| | pCOe2: E2 | | pCOe1: E5 to E8 |
| Belimo® | M1 to M8 | | |

Tab. 6.d

### Configuring alarms

Configuration of alarms, the function of the contact, alarm delay and type of alarm must be completed during installation. The following table shows the settings.

Normally open (NO)

Normally close (NC)

| Type of alarm | Enabling | Config. | Delay |
|---|---|---|---|
| Generic | Always | Hb25 | Hc20 |
| Serious | Always | Hb25 | - |
| Frost protection | Ha16 | Hb25 | - |
| Supply filter 1 | Always | Hb26 | - |
| Supply filter 2 | Always | Hb26 | - |
| Return filter | Ha01-Hc07 | Hb26 | - |
| Supply flow switch | Always | Hb27 | Startup and steady operation: Hc07 |
| Return flow switch | Ha01-Ha04 | Hb27 | |
| Pump 1 thermal overload | | | |
| Cooling coil | Ha09-Ha10 | Hb30 | |
| Preheating | Ha09-Ha11 | Hb30 | |
| Reheating | Ha09-Ha12 | Hb30 | |
| Pump 2 thermal overload | | | |
| Cooling coil | Ha09-Ha10 | Hb31 | |
| Preheating | Ha09-Ha11 | Hb31 | |
| Reheating | Ha09-Ha12 | Hb31 | |
| Coil flow switches | | | |
| Cooling coil | Ha09 | Hb32 | |
| Preheating | Ha09 | Hb32 | |
| Reheating | Ha09 | Hb32 | |
| Fan thermal overloads | | | |
| Supply 1 | Ha04 | Hb29 | |
| Supply 2 | Ha01, Ha03 (Backup), Ha04 | Hb29 | |
| Return 1 | Ha01, Ha04 | Hb29 | |
| Return 2 | Ha01, Ha03 (Backup), Ha04 | Hb29 | |
| Humidifier | Ha01 | Hb28 | |
| Supply inverter | Ha03 | Hb28 | |
| Return inverter | Ha01, Ha03, Ha04 | Hb28 | |
| Preheat heater thermal overload | Ha05 | Hb33 | |
| Reheat heater thermal overload | Ha08 | Hb33 | |
| Dirty heat recovery unit | Ha01 | Hb33 | Hc18 |
| Dirty filter | Always | Hb34 | |
| Fire & Smoke | Always | Hb34 | |
| Door open | Always | Hb34 | |
| General | Always | Hb40 | |
| BMS offline | Ge02 | | |
| Number of warnings (attempts) for pumps | | | |
| Cool/heat-cool coil | Ha10 | | |
| Preheating | Ha11 | | |
| Reheating | Ha12 | | |

Tab. 6.e

**Note**: following configuration, the screens in menu D show the inputs and outputs that have effectively been configured.

## 6.4 Device control parameters (Hc)

Once the devices available and the probes/digital inputs have been selected, the main control parameters are configured on the Hc screens. These include:

- selection of temperature and humidity control probes (supply, return, room);
- minimum and maximum limits for the dampers;
- fan activation delays after opening the dampers (opening time) and damper closing time after the fans stop (closing delay);
- delay time for star/delta starting;
- floating valve travel times;
- fan inverter parameters.

See the following paragraphs and the "Functions" chapter for a more detailed description of the control parameters.

**Note**: if a heating/cooling coil is used the heating/cooling digital output can be enabled (screen Hb42) to switch operation according to demand and the switching delay set on Hc12.

**Important**: the "Fieldbus" car cannot be installed on the pCOXS, however there is a version with integrated Belimo card (code PCO1MP0CX0).

## 6.5 pCOe expansion card connection

After having inserted the serial card (PCO100FD10) in the slot marked "field card", up to 2 pCOe expansion cards can be connected, and must be enabled on screen Ha26. Each pCOe card can be connected to:

- 4 Carel NTC probes (-50T90 °C; R/T = 10 kΩ at 25°C) or active probes: 0 to 1 Vdc, 0 to 10 Vdc, 4 to 20 mA, selectable via software in groups of two (B1, B2 and B3, B4)
- 4 digital inputs;
- 1 analogue output;
- 4 digital outputs.

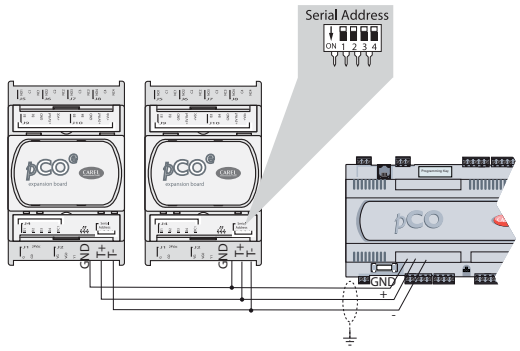



Fig. 6.c

Each expansion card must be set with a unique network address using the dipswitches. The configuration screens are used to select:

- the card address;
- the functions of the probes.

| Mask index | Display description | Selection |
|---|---|---|
| Ha26 | pCOe number | 1 to 2 |
| | pCOe 1 address | 1 to 5 |
| | pCOe 2 address | 1 to 5 |
| Hb01 to Hb08 | Analogue inputs | |
| | Supply, return, outside, room temperature | |
| | Supply, return, outside, room humidity | |
| | position ≠ 0 | |
| | type: 4 to 20 mA ¦ 0 to 1 V ¦ 0 to 10 V | |

Tab. 6.f

**Note:**

- the position of the probes connected to pCOe is defined as follows

| | | |
|---|---|---|
| pCOe | pCOe 1 | E1, E2, E3, E4 |
| | pCOe 2 | E5, E6, E7, E8 |

- E1 to E8 identify both analogue and digital inputs.
- the position of the digital outputs connected to pCOe is defined as follows:

| | | |
|---|---|---|
| pCOe | pCOe 1 | E1, E2, E3, E4 |
| | pCOe 2 | E5, E6, E7, E8 |

- the position of the analogue outputs connected to pCOe is defined as follows:

| | | |
|---|---|---|
| pCOe | pCOe 1 | E1 |
| | pCOe 2 | E2 |

## 6.6 Serial probe connection

After having inserted the serial card (PCO100FD10) in the slot marked "field card", up to 6 serial probes can be connected, and must be enabled on screen Ha26.

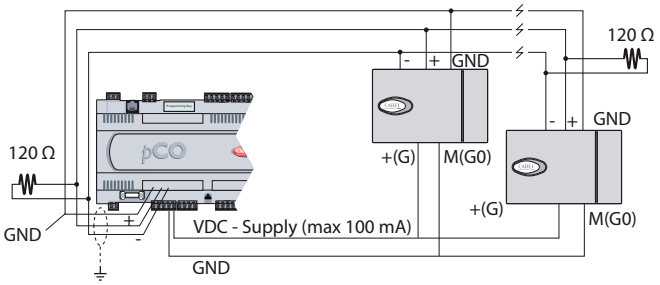



Fig. 6.d

For each serial probe, the following need to be selected using the dipswitches (see the figure):

- a unique network address;
- communication speed (baud rate), the same as set on screen Ha25;

The configuration screens are used to select:

- a unique network address;
- the type, i.e. temperature or temperature/humidity probe (Ha91);
- the default probe parameter settings;
- assignment of the function to the serial probe (e.g. supply/return/room temperature /humidity probe).

### Setting the parameters and the address

The default values (Baud rate = 19200, Stop bits = 2, Timeout = 300 ms, Priority = none) can be displayed and modified if necessary on screen Ha05. For DP probes, on the other hand, set dipswitches 6, 7 and 8 (6 = OFF, 7 = ON, 8 = OFF), while the address Adr = 128 to 133 is set using dipswitches 1 to 5.

**Note**: for further details and for the connection diagrams, see the DP serial probe manual (+030220660).

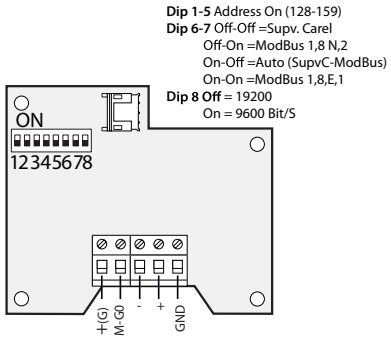



Fig. 6.e

| Mask index | Display description | Selection |
|---|---|---|
| Ha24 | Protocols | |
| | Field port | Modbus master |
| Ha25 | Modbus Master settings | |
| | Baudrate | 9600 ¦ 19200 |
| Ha26 | Number of serial probes | No, 1 to 6 |
| Ha31 | Press Enter to configure serial probes ➔ Ha91 | |
| Ha91 to Ha96 | Serial probe no. 1 to 6 | |
| | Address | 128 to 159 |
| | Type | Temperature ¦ Temperature+humidity |
| | Default installation | No ¦ Yes |
| Hb01 to Hb08 | Analogue inputs | |
| | Supply, return, outside, room temperature | |
| | Supply, return, outside, room humidity | |
| | position > 0 | |
| | Min limit, max limit | |

Tab. 6.g

**Note**

- default installation refers to the default configuration of serial probe parameters shown on the probe instruction sheet;
- also set the address, protocol and communication speed using the dipswitches on the serial probe;
- the position of the serial probes is defined as follows:

| | | |
|---|---|---|
| Serial probes | Temperature | T1 to T6, A1 to A6 |
| | Humidity | H1 to H6, A1 to A6 |

with the following meanings:

| | |
|---|---|
| A1 | Average between all probes |
| A2 | Average between 1, 2 |
| A3 | Average between 1, 2, 3 |
| A4 | Average between 3, 4 |
| A5 | Average between 4, 5 or 4, 5, 6 |
| A6 | Average between 5, 6 |

## 6.7 VFD inverter connection

The inverter is used to manage the fan speed, for constant pressure and fixed speed control modes. After having inserted the serial card (PCO100FD10) in the slot marked "field card", up to 2 VFD inverters can be connected for the control of supply and return air fans, which must be selected on screen Ha03.
Note: serial network connection is also useful for ON/OFF or fixed speed fan control, as the inverter parameters can be set directly from the terminal.

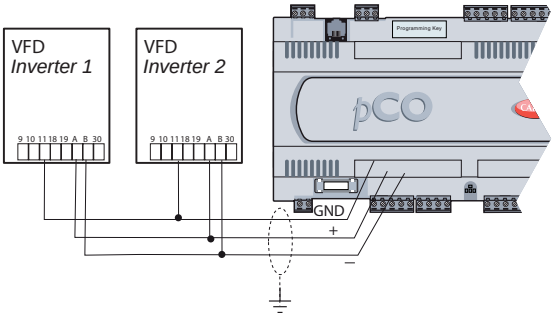



Fig. 6.f

| Mask index | Display description | Selection |
|---|---|---|
| Ha03 | Fan type | 4: Inverter ¦ |
| | Fan regulation | 1: Constant pressure ¦2: Air quality ¦ 3: Fixed speed ¦ |
| Ha24 | Field port | Modbus master |
| Ha29 | Press Enter to configure the VFD | |
| Ha39 | Enable VFD: Modbus protocol: Yes | |

Tab. 6.h

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Ha40/Ha50 | Supply/return VFD | | | | |
| | Address | 1/2 | 0 | 999 | - |
| | Data address | 0 | 0 | 9999 | - |
| | Data value | 0 | -32768 | 32767 | - |
| | Default install | N | No | Yes | - |
| Ha46/Ha56 | Supply/return VFD: motor parameters | | | | |
| | Volt | 0 | 180 | 690 | V |
| | Cosfi | 0.0 | 0.3 | 0.99 | - |
| | Frequency | 0 | 30 | 320 | Hz |
| | Speed | 0 | 300 | 20000 | rpm |
| | Current | 0 | -999.9 | 999.9 | A |
| | Current limit | 0 | 0 | 999.9 | A |
| Hc40/Hc50 | Supply/return VFD | | | | |
| | Volt at 0 Hz | 0 | 0 | 40 | % |
| | Switch frequency | 0 | 1 | 16 | kHz |
| | V/ f curve midpoint | | | | |
| | Voltage | 0 | 0 | 100 | % |
| | Frequency | 0 | 0 | 320 | Hz |

Tab. 6.i

| Mask index | Display description | Selection |
|---|---|---|
| Ha41/Ha51 | Supply/return VFD | |
| | Control place | 1: I/O terminal ¦2:Keypad ¦ 3: Fieldbus |
| | Speed reference type | 0: Ain1 ¦ 1: Ain2 ¦ 2: Keypad ¦ 3: Field-bus ¦ 4: Motor potentiometer ¦ 5:PID regulation |
| | Rotation type | Clockwise ¦ anticlockwise |
| Ha42/Ha52 | Supply/return VFD | |
| | Motor control mode | Frequency ¦ speed |
| | Start function | Ramp ¦ flying start |
| | Stop function | Ramp ¦ coasting |
| Ha43/Ha53, Ha44/ Ha54, Ha45/Ha55 | Action when in fault | See parameters table |
| Hc41/ Hc51 | Supply/return VFD | |
| | V/f ratio | Linear ¦ squared¦ programmable ¦ linear with flux optimisation |
| | V/f Optimisation | Not used ¦ automatic boost ¦ |
| | Auto restart | Not used ¦ used |

Tab. 6.j

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc42/ Hc52 | Supply/return VFD | | | | |
| | Min/ max frequency | 0 | 0 | Max freq. | Hz |
| | Acceleration time | 1 | 0.1 | 3200 | s |
| | Deceleration time | 1 | 0.1 | 3200 | s |

Tab. 6.k

Note

- the "control place" parameter establishes the source of the signal to the start/stop the fan. The "speed reference" parameter establishes the source of the speed/frequency reference. See the VFD inverter manual;
- for on/off fans, the VFD can be configured to set the parameters from the display.

## 6.8 Belimo actuator connection

After having inserted the serial card (PCO100FD10) in the slot marked "field card" (for the pCO1XS, code PCO1MP0CX0 is available with integrated Belimo card), up to 8 Belimo actuators (dampers, valves, etc.) can be connected, and must be selected on screen Ha27. The Belimo protocol must be set on screen Ha24. Each Belimo actuator can be connected to:

- an NTC probe;
- one 0 to 1 V or 0 to 10 V input;
- one digital input.

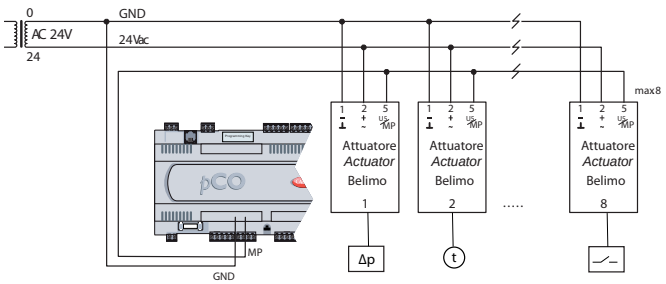



Fig. 6.g

The following parameters are selected on the screens for each actuator:

- actuator address setting procedure, manual or automatic;
- type of probe connected and the minimum/ maximum limits;
- function of the probe.

In addition, the adaptation procedure needs to be run to align the position.

| Mask index | Display description | Selection |
|---|---|---|
| Ha24 | Protocol | |
| | … | |
| | Field port | Belimo |
| Ha27 | Belimo devices | |
| | Number of actuators | 0 to 8 |
| Ha28 | Press Enter to configure Belimo actuators ➔Ha60 | |
| Ha60 | Belimo 1 to Belimo 8 | |

| | | |
|---|---|---|
| Ha60, Ha63 to Ha81 | Actuator type (read-only) | 1: None ¦ 2: Air actuator ¦ 3: Valve actuator ¦ 4: Valve actuator 5: None ¦6: Fire-smoke damper ¦ 7: None ¦ 8: VAV Smoke-fire damper ¦ 9: None |
| | Addressing mode | 0: Manual 1: Auto |
| | SN: 00000-00000-000-000 | |
| | Address actuator | 0:No¦ 1:Yes |
| Ha61, Ha64 to Ha82 | Enable external input/probe | 0:No¦ 1:Yes |
| | Type | NTC ¦ 0 to 1 V ¦ 0 to 10 V ¦ ON/OFF |
| | Min value | -999.9 to Max value |
| | Max value | Min value to 999.9 |
| Ha62, Ha65 to Ha83 | Position or air flow limits | |
| | Minimum | 0 to Maximum |
| | Maximum | Minimum to 100 |
| Gg60 to Gg67 | Belimo 1 to Belimo 8 | |
| | Start adaptation | No |
| | Start testrun | No |
| | Adapted angle | Yes |
| | Alarms reset | No |

Tab. 6.l

### Setting the Belimo actuator address

There are two procedures for setting the address:

1. automatic;
2. manual.

Automatic address setting

- identify the serial number from the barcode (see the figure);
- select "automatic" address setting mode;
- enter the number from the SN field in screens H60 to Ha81 (actuators 1 to 8);
- enter Yes in the Address actuator field;
- after a few seconds the message "address setting OK" is displayed to confirm that the address has been set successfully.

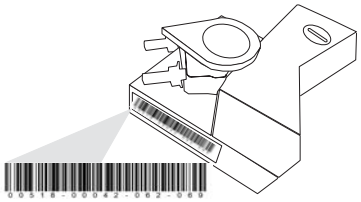


Fig. 6.h

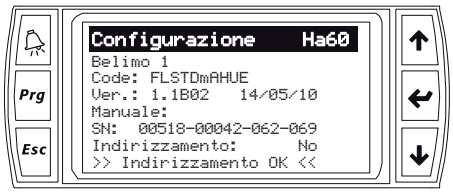



Fig. 6.i

Manual address setting

A. select "manual" address setting mode;
B. enter Yes in the Address actuator field;
C. press the button indicated by the arrow repeatedly (see the figure);
D. after a few seconds the message "address setting OK" is displayed to confirm that the address has been set successfully.

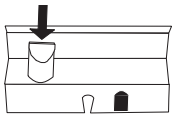


Fig. 6.j

Note: In the event of errors, to reset the address, repeat steps A and B and then set the "Address actuator" field to No.

## 6.9 Probes from supervisor

The BMS port fitted with the RS485 serial card can be connected to a supervisor (PlantVisorPro, PlantWatchPro) that sends the values of up to 4 probes. The BMS serial protocol must be set (Ha24) to "BMS", while the BMS configuration (Ge01) must be set by selecting the protocol (e.g. Modbus), communication speed and network address. Supervisor probes must be enabled (Ha30), and the backup probes used after a certain timeout following interruption to communication defined, and finally the functions assigned on the "Hb" screens. The supervisor probes are identified by letters S1 to S4.

**Note**: the values of the probes and digital inputs can be written by the supervisor, however analogue inputs can be set as backup only for the probes (not for the digital inputs) already utilized or to be configured for the application in use.

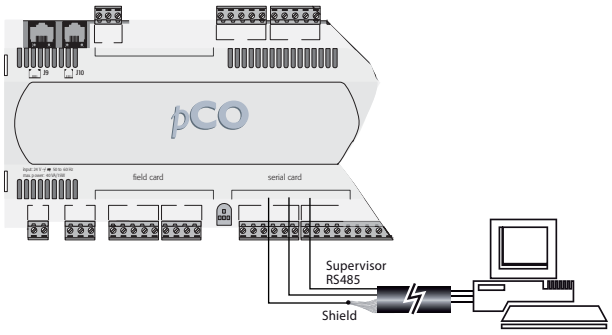



Fig. 6.k

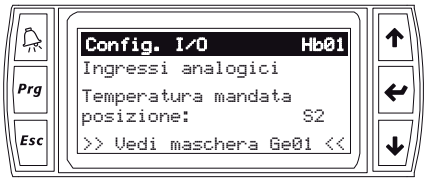



Fig. 6.l

| Mask index | Display description | Selection |
|---|---|---|
| Ha24 | Protocol | |
| | pLAN port | pLAN |
| | BMS port | BMS ¦ Winload |
| | Field port | Modbus master ¦ Belimo |
| Ha30 | Enable BMS probes and digital inputs | No ¦ Yes |
| | Backup probe 1 | None, AIN1 to AIN10 |
| | Backup probe 2 | None, AIN1 to AIN10 |
| | Backup probe 3 | None, AIN1 to AIN10 |
| | Backup probe 4 | None, AIN1 to AIN10 |
| Ge01 | BMS configuration | |
| | BMS protocol | Modbus ¦ LON ¦ CAREL |
| | Baud rate | 1200 ¦ 2400 ¦ 4800 ¦ 9600 ¦ 19200 |
| | Address | 0 to 207 |
| Ge02 | BMS offline alarm enable | No ¦ Yes |
| | Timeout | 0 to 900 s |

Tab. 6.m

# 7. COMMISSIONING

Commissioning refers to installation of the electrical panel in the field and setting the air handling unit application software parameters, as well as all the operations needed to complete the setup of the devices. The Commissioning procedure is activated on the screen Ge03, after having fitted the BMS RS485 card on the controller and established the connection to a personal computer running the pCO Manager program (see the appendix).

## 7.1 Loading the configuration

If necessary, load the configuration saved following the software configuration procedure, on screen Gfd01. Once the parameters have been loaded, the following operations are possible:

1. verify correspondence of the I/Os to the design AHU;
2. set the PID parameters for temperature and humidity control, air quality and advanced control functions (cascade, supply limits, compensation, etc..). See the "Functions" chapter;
3. set the auxiliary control loops, if featured;
4. set the baudrate and serial address for Fieldbus and BMS serial communication;
5. calibrate the probes;
6. manually calibrate the fans, coil actuators, humidifier, and activate purging.

Note: see the screens in menus Ga, Gb, Gc, Gfc, Ge, Gg and the "Functions" chapter.

## 7.2 Commissioning

Warning: before performing any operation on the pCO board, disconnect power to the device by moving the main switch on the electrical panel to OFF.

To configure the parameters using PCO Manager:

1. Disconnect any BMS cards other than the RS485 card (e.g. LON);
2. Connect the BMS RS485 card;
3. Activate the Commissioning service on screen Ge03;


Fig. 7.a

4. Connect to the computer via the USB/RS485 connector;

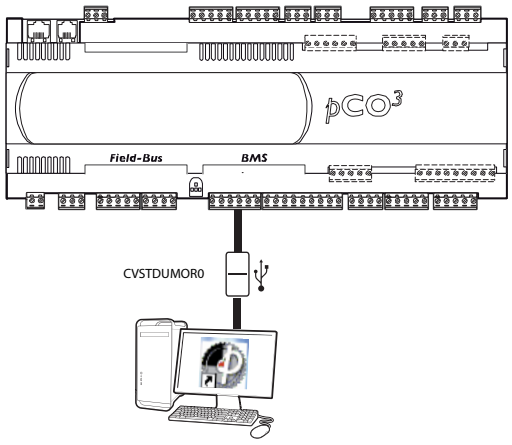



Fig. 7.b

5. Perform the commissioning procedure using pCO Manager. See the appendix;
6. At the end the operations, stop the Commissioning service.

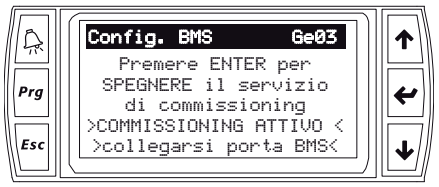



Fig. 7.c

7. Reconnect the BMS card and restore power.

Note: the commissioning service automatically sets the BMS protocol to "Winload". Once the procedure has ended, the protocol automatically returns to "BMS", allowing reconnection to the supervisor.

## 7.3 Probe calibration

In menus Gfb01 to Gfb08, calibrate the probes if necessary and check the correct reading against a sample probe.
See the parameters table.

## 7.4 Setting the control parameters

To set the control parameters see the "Software configuration" and "Functions" chapters. The parameters can be modified from the terminal or a personal computer using the pCO Manager program. See the appendix.

## 7.5 Setting the hour counters

On screens Gfa01 to Gfa06 (see the parameters table) a maximum number of operating hours before maintenance is required can be set for each device. On exceeding the maintenance hours, a "warning" is signalled on the display and recorded in the alarm log, without affecting control. Access screens Gfa01 to Gfa06 again to reset the warning. The purpose is to allow service personnel to be notified to ensure preventive maintenance.

## 7.6 Enthalpy management

Enter the atmospheric pressure for parameter Gfc16 to allow the controller to correctly calculate the values on the psychrometric chart.

| Mask index | Display description | Def | UOM | Min | Max |
|---|---|---|---|---|---|
| Gfc16 | Enthalpy management | | | | |
| | Atmospheric pressure | 1090 | mbar | 600 | 1100 |

Tab. 7.a

## 7.7 I/O test

Screens He01 to He50 can be used to test the actuators during installation, see menu Gg01. Modulating fan actuators can be adjusted from 0 to 100% to achieve design air flow-rates. For the digital outputs, 0% corresponds to OFF and 100% to ON.

# 8. FUNCTIONS

FLSTDMAHUE features advanced control functions that can be activated based on the devices installed on the air handling unit:
- Temperature and humidity control;
- Freecooling and freeheating;
- Heat recovery;
- Air quality;
- Air cleaning (purging);
- Priority to temperature or humidity control;
- Set point compensation;
- Automatic summer/winter (cooling/heating) changeover;
- Temperature and humidity supply limits;
- Auxiliary control loops;
- Frost protection and room protection.

The possible operations are described below; additional custom functions can be created using the 1tool programming environment modules. Refer to this for further information.

## 8.1 On/Off

### ON

Before switching On, the AHU temporarily goes through the Start-up stage, during which the controller checks for any alarms, opens the dampers and when open starts the supply and return air fans. ON status requires the following, with a logical AND relationship:
- digital input;
- keypad or BMS with keypad override;
- scheduler (time bands)
- BMS.

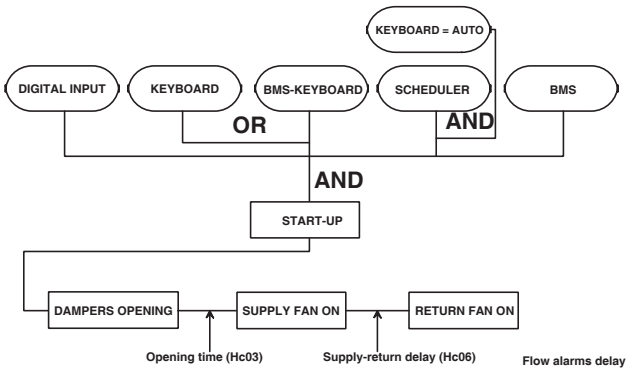



Fig. 8.a

Note:
- the keypad (A01) switches the AHU ON if "Comfort", "Precomfort" or "Economy" has been set;
- BMS with keypad override means the possibility to override the selection made on the keypad using a BMS variable;
- ON from scheduler requires the keypad to be set to AUTO;
- ON from BMS is a further ON signal using a separate variable.

See the list of BMS variables.

### OFF

Before switching Off, the AHU temporarily goes through the Shutdown stage, during which the controller stops the devices and fans and closes the dampers. ON status requires the following, with a logical OR relationship:
- digital input;
- keypad;
- scheduler
- BMS.

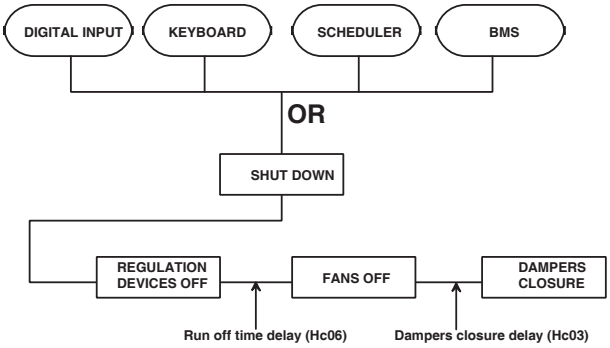



Fig. 8.b

## 8.2 Set point

After having selected the main temperature and humidity probes and cooling and heating set points for each operating mode (screens B02, B03, B04), screen B01 displays the temperature and humidity set points. The maximum and minimum limits for the temperature and humidity set points in cooling and heating can be set in the Service menu, on screens Gfc02 and Gfc03. For the temperature set point, an offset from analogue input can be enabled on Ha19, and the effect of the offset seen on B01, i.e. display the current working set point and the affect of the offset on the set points defined on B02, B03, B04. The following inputs can also be enabled, configured on Hb24:
1. change in set point from comfort to economy from digital input, enabled on Ha18 and configured on Hb24 (double set point);
2. remote On/Off, directly configured on Hb24.

| Mask index | Display description | Selection |
|---|---|---|
| Ha18 | Setpoint from digital input | 0:No¦ 1:Yes |
| Hb24 | Double set point | Position ≠0 |
| Ha19 | Enable setpoint offset by analog input | 0:No¦ 1:Yes |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| B02/B03/ B04 | Comfort/Pre-comfort/ Economy temp. summer | - | Lim. Inf. (Gfc02) | Lim. Sup. (Gfc02) | °C |
| B02/B03/ B04 | Comfort/Pre-comfort/ Economy temp. winter | - | Lim. Inf. (Gfc02) | Lim. Sup. (Gfc02) | °C |
| Gfc02 | Temperature set limits | | | | |
| | Summer low | 15 | -99.9 | 99.9 | °C |
| | Summer high | 35 | Summer low | 99.9 | °C |
| | Winter low | 15 | -99.9 | 99.9 | °C |
| | Winter high | 35 | Winter low | 99.9 | °C |
| Gfc03 | Humidity set limits | | | | |
| | Summer low | 30 | 0 | 100 | %rH |
| | Summer high | 90 | Summer low | 100 | %rH |
| | Winter low | 30 | 0 | 100 | %rH |
| | Winter high | 90 | Winter low | 100 | %rH |

## 8.3 Temperature control

### Enabling

The following need to be enabled:

1. the probe used for control (Hc01);
2. the type of control (proportional, proportional+integral, proportional+integral+derivative), the same for heating and for cooling (Gfc04);
3. the PID control parameters for winter and summer operation and the corresponding neutral zone (Gfc05, Gfc06);
4. the cooling and heating temperature set point limits (paragraph 8.2), if control is on the return/room probe;
5. if necessary, cooling in winter and heating in summer (auto heat/cool, Gfc04);
6. if the reheating coil only operates to supplement the action of the preheating coil (integration) or also to compensate (compensation) for the lowering in temperature due to dehumidification (Ha08).

Note:

- the heating and cooling coils have a minimum opening settable by parameter, therefore if the control probe value does not deviate from the set point by more than the neutral zone and the resulting request is not sufficient to reach the minimum opening, the valve won't open; see the following graphs;
- control normally performs heating in winter and cooling in summer. Only if auto cool/heat is set (Gfc04) heating can also be applied in summer and cooling in winter, based on the current set point;
- for simplicity the following graphs refer to proportional control only;
- see available literature for more complete details on PID control.

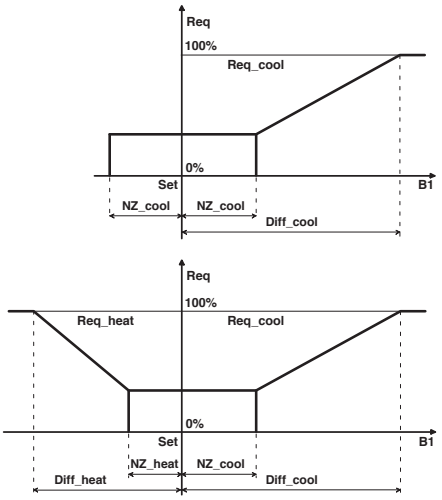



Fig. 8.c

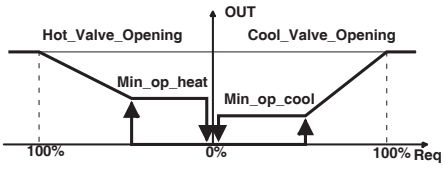



Fig. 8.d

Key

| | | | |
|---|---|---|---|
| Req_heat | Heating request | Req_cool | Cooling request |
| Req | Request | B1 | Control probe |
| Diff_cool | Cooling differential | Diff_heat | Heating differential |
| Set | Set point | | |
| Min_op_cool | Cooling valve minimum opening | Min_op_heat | Heating valve minimum opening |
| NZ_cool | Neutral zone in cooling | NZ_heat | Neutral zone in heating |

| Mask index | Display description | Selection |
|---|---|---|
| Ha08 | Reheating output | Integration ¦ Compensation ¦ Compensation + integration |
| Hc01 | Main regulation probe selection | |
| | Temperature | Return ¦ supply ¦ room |
| Gfc04 | Regulation type | Proportional ¦ Proportional + integral ¦ PID |
| | Auto cool/heat | NO ¦ YES |

| Mask index | Display description | Def | Min | Max | U.M |
|---|---|---|---|---|---|
| Gfc02 | Temperature set limits | | | | |
| | Summer low | 15 | -99.9 | 99.9 | °C |
| | Summer high | 35 | Summer low | 99.9 | °C |
| | Winter low | 15 | -99.9 | 99.9 | °C |
| | Winter high | 35 | Winter low | 99.9 | °C |
| Gfc05 | Cooling regulation | | | | |
| | Differential | 2 | 0 | 99.9 | °C |
| | Neutral zone | 1 | 0 | 99 | °C |
| | Integral time | 300 | 0 | 999 | s |
| | Derivative time | 0 | 0 | 999 | s |
| Gfc06 | Control hot | | | | |
| | Differential | 2 | 0 | 99.9 | °C |
| | Neutral zone | 1 | 0 | 99 | °C |
| | Integral time | 300 | 0 | 999 | s |
| | Derivative time | 0 | 0 | 999 | s |
| Gfc23 | Minimum cooling valve opening | | | | |
| | Cooling | 0 | 0 | 100 | % |
| Gfc24 | Minimum opening heating valve | 0 | 0 | 100 | % |
| Gfc26 | Minimum heat/cool valve opening | | | | |
| | Cooling | 0 | 0 | 100 | % |

Note: the graphs show that the valves do not open inside the neutral zone around the set point, therefore the heating or cooling action is not performed.

## 8.4 Humidity control

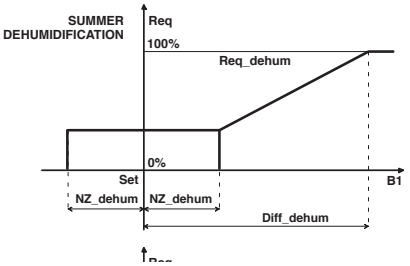
### Enabling

The following must be enabled or selected:

1. the humidifier (Ha01);
2. the type of humidifier (Ha13) and in the event of adiabatic humidifier the supply temperature lower limit (Gfc35);
3. the probe used for humidity control (Hc01);
4. for adiabatic humidifiers, the air preheating probe (Gfc25, Gfc27);
5. the type of control (proportional, proportional+integral, proportional+integral+derivative, on Gfc10);
6. the PID control parameters for humidification and dehumidification and the corresponding neutral zone (Gfc12, Gfc11);
7. the humidity set point limits in summer and winter (paragraph 8.2);
8. humidification in summer or dehumidification in winter according to request (auto hum/dehum, Gfc10);
9. whether the reheating coil acts to supplement the preheating coil (integration) or also to compensate for the reduction in temperature due to dehumidification (Gfc28).

Note:

- control normally performs humidification in winter and dehumidification in summer. Only if auto hum/dehum is set (Gfc10) humidification is also performed in summer and dehumidification in winter;
- the minimum opening in dehumidification mode may be different from that in cooling because represents the minimum passage of water that manufactures dehumidification.



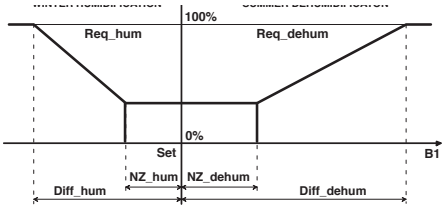



Fig. 8.e

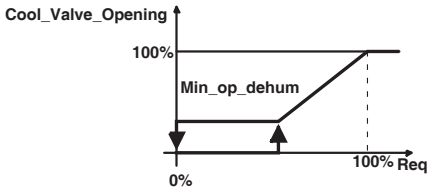



Fig. 8.f

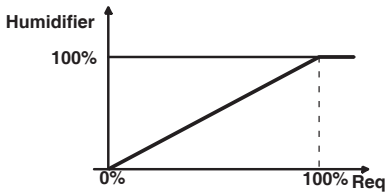



Fig. 8.g

Key

| Req | Request | Set | Humidity set point |
|---|---|---|---|
| Diff_dehum | Dehumidification differential | Diff_hum | Humidification differential |
| NZ_hum | Neutral zone in humidification | NZ_dehum | Neutral zone in dehumidification |
| B1 | Control probe | Min_op_dehum | Cooling valve minimum opening |

| Mask index | Display description | Selection |
|---|---|---|
| Ha01 | Main device enable | |
| | Humidifier | Disabled ¦ Enabled |
| Ha06 | Dehumidification | 1: Request humidity ¦ 2: Point dew ¦3: Disabled |
| Ha08 | Reheating output | Integration ¦ Compensation ¦ Compensation+ Integration |
| Ha13 | Humidifier | |
| | Type | Isothermal (ON/OFF control) ¦ Isothermal (Control model.) ¦ Adiabatic (ON/OFF control) ¦ Adiabatic (Control model.) |
| Hc01 | Main regulation probe selection | |
| | Humidity | Return ¦ supply ¦ room |
| Gfc10 | Humidity regulation | |
| | Regulation type | Proportional ¦Proportional+integral ¦ PID |
| | Auto hum/dehum | No ¦ Yes |
| Gfc35 | Adiabatic humidifier - Supply low temperature limit | |
| | Enable limit | No ¦ Yes |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| B02/B03/ B04 | Comfort/Pre-comfort/Economy temp. summer | - | 0 | 100 | % RH |
| B02/B03/ B04 | Comfort/Pre-comfort/Economy temp. winter | - | 0 | 100 | % RH |
| Gfc11 | Dehumidification regulation | | | | |
| | Differential | 5 | 0 | 100 | % RH |
| | Neutral zone | 5 | 0 | 100 | % RH |
| | Integral time | 300 | 0 | 999 | s |
| | Derivative time | 0 | 0 | 999 | s |
| Gfc12 | Humidification regulation | | | | |
| | Differential | 4 | 0 | 100 | % RH |
| | Neutral zone | 2 | 0 | 100 | % RH |
| | Integral time | 300 | 0 | 999 | s |
| | Derivative time | 0 | 0 | 999 | s |
| Gfc23 | Minimum cooling valve opening | | | | |
| | Dehumidification | 0 | 0 | 100 | % |
| Gfc26 | Minimum heat/cool valve opening | | | | |
| | Dehumidification | 0 | 0 | 100 | % |

## Humidification control

The control parameters are as follows:

| Mask index | Display description | Selection |
|---|---|---|
| Ha05 | Temperature probe when humidifying (preheating coil) | Off coil ¦ Regulation |
| Ha07 | Temperature probe when humidifying (heat-cool coil) | Off coil ¦ Regulation |
| Ha13 | Humidifier type | Isothermal ¦ adiabatic |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc25 | Preheating coil settings when humidifying | | | | |
| | Setpoint | 23 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 99.9 | °C |
| Gfc27 | Heat/cool coil settings when humidifying | | | | |
| | Setpoint | 20 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 99.9 | °C |
| Gfc35 | Adiabatic humidifier – Supply low temperature limit | | | | |
| | Enable limit | No | No | Yes | - |
| | Setpoint | 15 | 0 | 99.9 | °C |
| | Differential | 2 | 0 | 99.9 | °C |

Control is performed in two ways, according to the type of humidifier:

1. isothermal: air humidification is performed with a negligible variation in the supply air temperature. The controller sends the signal to start steam production and/or modulate output using a 0 to 10 V signal until reaching the humidity set point. Example of humidification from point A (-5 °C, 85 % RH) to point B (20 °C, 50 % RH).

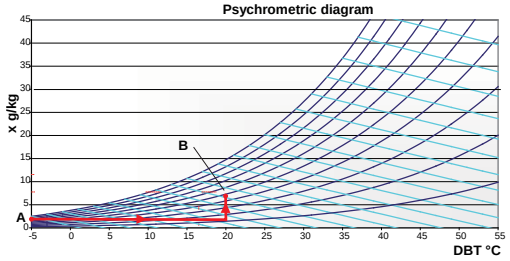



Fig. 8.h

Key

x Absolute humidity DBT Dry bulb temperature

2. adiabatic:evaporationofthedropletsofatomisedwaterbringsaboutcooling of up to 10 °C if the air is warm and dry to start with. To compensate for this effect and increase humidification efficiency, the preheating coil is activated based on the saturation probe and in any case a minimum air temperature limit is set for the supply probe so as to stop humidification if the air temperature falls too low. Example of humidification from point A (-5 °C, 85 % RH) to point B (20 °C, 50 % RH).

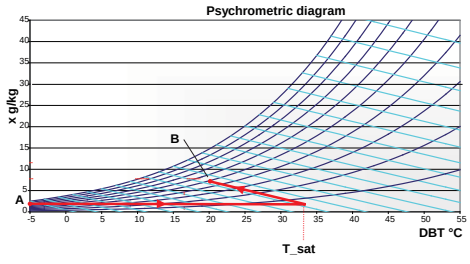



Fig. 8.i

Key

x Absolute humidity DBT Dry bulb temperature

### Dehumidification control

Control is performed in two ways, according to the settings:

1. humidity request: based on the humidity control probe reading, the cooling actuator is modulated proportionally to request so as to reach the humidity set point.

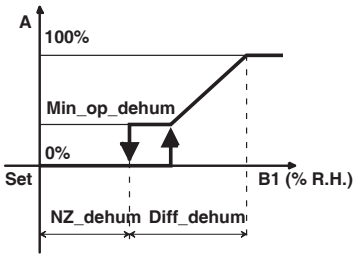



Fig. 8.an

Key

| | | | |
|---|---|---|---|
| A | Cooling actuator opening | Set | Humidity set point |
| B1 | Humidity control probe | Min_op_dehum | Cooling coil minimum opening |
| NZ_dehum | Neutral zone in dehumidification | Diff_dehum | Dehumidification differential |

| Mask index | Display description | Selection |
|---|---|---|
| Ha06 | Dehumidification | Humidity request |

2. dewpoint: the dehumidification request is managed based on the humidity set point and the differential, according to the humidity measured by the control probe. Once the request signal is received, the controller uses the dewpoint calculation starting from the humidity and temperature set point to adjust the cooling actuator, comparing the set point against the value measured by the saturation temperature probe located downstream of the cooling coil or the humidifier, if featured. As soon as the humidity probe detects a dehumidification request, the control calculates the final dewpoint and sets this as the temperature set point (T_set_R) after the cooling coil.

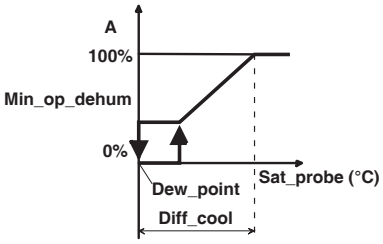



Fig. 8.ao

Key

| | | | |
|---|---|---|---|
| A | Cooling actuator opening | Dew_point | Dewpoint |
| Sat_probe | Saturation probe | Min_op | Coil minimum opening |

| Mask index | Display description | Selection |
|---|---|---|
| Ha06 | Dehumidification | On dew point |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc05 | Cooling regulation Differential | 2 | 0 | 99.9 | °C |

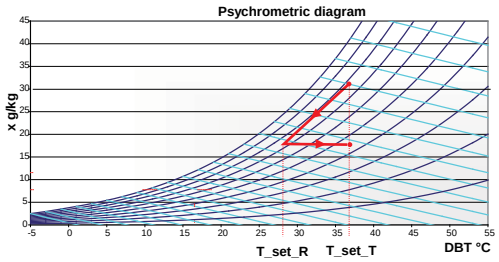



Fig. 8.ap

Key

| | | | |
|---|---|---|---|
| T_set_R | Dewpoint | T_set_T | Temperature set point |

For both dehumidification methods, the reheating coil will, based on the supply probe reading, reheat the air to the temperature set point (Gfc28), in case of Return temperature control. The control algorithm is proportional only, with its own differential.
In case of Supply temperature control the reheating coil follows the normal temperature control.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc28 | Reheating coil compensation setting | | | | |
| | Setpoint | 24 | -99.9 | 99.9 | °C |
| | Differential | 3 | 0 | 99.9 | °C |

## 8.5 Temperature / humidity control priority

To control temperature and humidity, the coils and the humidifier must be enabled and the types must be set. The following also need to be activated and set:

1. the temperature and humidity control probes;
2. the dehumidification function and mode;
3. the humidifier and control probe;
4. the temperature and humidity set points.

Simultaneous requests for:

1. heating and humidification;
2. dehumidification and cooling:
   are not incompatible as regards activation of the devices, consequently if a priority has been set the controller will try to satisfy both requests. If this involves the same actuator, the latter operates based on the higher of the two requests. To prevent uncomfortable situations being created, the "supply limits" function can be used.

On the other hand, in the event of simultaneous requests for:

1. heating and dehumidification;
2. cooling and humidification,
   control is performed according to the table below, based on the whether the priority is set for temperature or humidity.

TEMPERATURE PRIORITY

| Temp. request | Humidity request | Preheating coil | Cooling coil | Reheating coil | Humidifier |
|---|---|---|---|---|---|
| Heating | Dehumidif. | Based on temperature control probe | Off | If "integration" | |
| Cascade control | Off | | | | |
| Cooling | Humidific. | Off | Based on temp. control probe | Off | Waits for temperature set point to be reached |

Tab. 8.a

**Note**: in the case of request of cooling and dehumidification the control considers the greater than the two required on the cooling coil.

HUMIDITY PRIORITY

| Temp. request | Humidity request | Preheating coil | Cooling coil | Reheating coil | Humidifier |
|---|---|---|---|---|---|
| Heating | Dehumidif. | Waits for humidity set point to be reached | Based on humidity control probe | If "compensation" | |
| acts on supply | Off | | | | |
| Cooling | Humidific. | Acts on saturated probe set point if humidifier = adiabatic | Waits for humidity set point to be reached | Off due to cooling | Based on humidity control probe |

Tab. 8.b

## 8.6 Set point compensation

Set point compensation adjusts the set point defined by the user with an offset that depends on a probe. This function in some cases ensures energy saving by adapting the set point to the outside temperature, while still guaranteeing suitable values for comfort. A temperature set point of 23 °C for example can be adjusted to 21 °C when the climate is extreme. In other cases, it's used to:

1. improvecomfort,reducingthedifferencebetweentheoutsidetemperature and the inside or room temperature;
2. integrate another air-conditioning system: for example, if in summer at 7 in the morning the outside temperature is lower than the room temperature, the room probe can be used as the compensation probe and the supply probe as the control probe to lower the set point and exploit freecooling.

The following are possible:

1. differentiate between compensation in summer and winter;
2. selecttheprobeusedforcompensation,betweenoutside,supply,returnand room probe;
3. increase or decrease the set point being compensated.

Note: compensation is disabled if the control probe and the compensation probe are the same.

Below is an example with the compensation probe set as the outside temperature probe that compensates the room temperature set point.

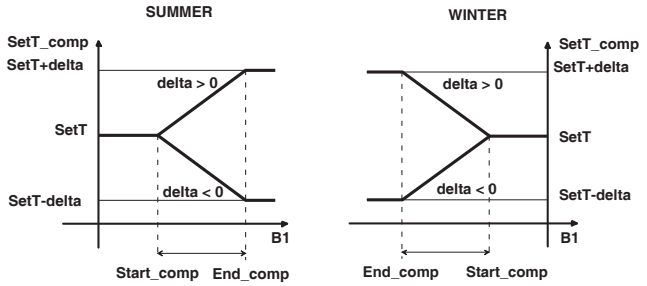



Fig. 8.aq

Key

| | | | |
|---|---|---|---|
| SetT | Temperature set point | End_comp | End compensation |
| Delta | Compensation delta | B1 | Compensation probe |
| Start_comp | Start compensation | SetT_comp | Compensation set point |

| Mask index | Display description | Selection |
|---|---|---|
| Hc01 | Main regulation probe selection | |
| | Temperature | Return ¦ supply ¦ room |
| Gfc08 | Type of summer set point compensation | |
| | None ¦ external ¦ room ¦ supply ¦ return | |
| | Compensation delta | 2 °C |
| | Compensation start | 25 °C |
| | Compensation end | 32 °C |
| Gfc09 | Type of winter set point compensation | |
| | None ¦ external ¦ room ¦ supply ¦ return | |
| | Compensation delta | -2 °C |
| | Compensation start | 0 °C |
| | Compensation end | -8 °C |

## 8.7 Summer/winter changeover

This changeover can be performed from the keypad, digital input or supervisor (BMS), based on the heating/cooling coil temperature or automatically. Summer/winter changeover switches the control set point from summer to winter. The basic function involves switching from cooling in summer to heating in winter. If "Auto" cool/heat is active (Gfc04) both heating and cooling are possible in summer and winter.

| Mask index | Display description | Selection |
|---|---|---|
| Gc01 | Season selection from | Keypad ¦ Digital input ¦ B.M.S ¦ Keypad /B.M.S. ¦Auto ¦ H2O Temperature |
| Gc02 | Set season | Auto ¦ Fix days |
| Gfc04 | Temperature regulation | |
| | Auto cool/heat | No ¦ Yes |

For automatic season changeover, on screen Gc01 and Gc02 the season must be selected as "Auto". Automatic selection allows the changeover to be managed "actively", in the sense that for one month before and one month after the set date the season changeover can be brought forward or postponed if the outside temperature remains above or below a certain level for a certain set time in hours (both to enter and exit the function, eliminating swings in system operation). This allows a temporary change in season (and corresponding set point) without having to act manually to adapt for days with uncharacteristic outside temperatures for that period.

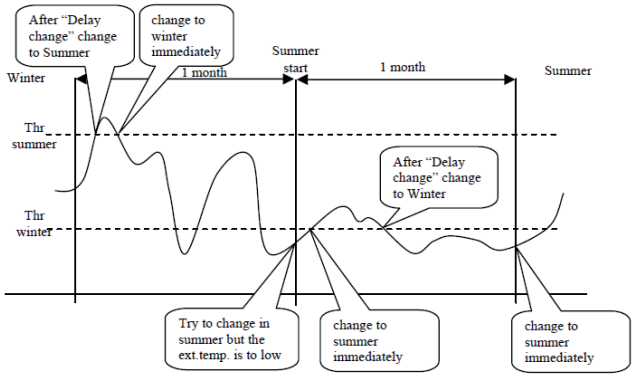



Fig. 8.ar

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gc02 | Set season | | | | |
| | Summer start | 15/05 | 01/01 | 31/12 | dd/mm |
| | Winter start | 30/09 | 01/01 | 31/12 | dd/mm |
| | Threshold summer | 25 | -99.9 | 99.9 | °C |
| | Threshold winter | 10 | -99.9 | 99.9 | °C |
| | Delay change | 1 | 0 | 999 | hour |

## 8.8 Freecooling and freeheating

Note: when the AHU is in freecooling/freeheating mode, the bypass damper on the heat recovery unit is open and consequently heat recovery is disabled.

### Definition

In air-conditioning systems the freecooling/freeheating functions are used to cool/heat for free using only a part or all the fresh air intake, when the temperature and relative humidity conditions allow. Freecooling and freeheating are thus considered free sources of energy, activated with priority over cascade control in cooling and heating. Demand is shared between the various cascade control devices. The function has two stages:

1. checkwhethertheoutsidetemperatureorenthalpyconditionsarefavourable compared to the return air conditions;
2. control the opening of the fresh air damper based on the cooling/heating request.

## Enabling

The freecooling/freeheating function can only be enabled if the mixing damper is installed and the corresponding output is configured.

Note: if the AHU has the fresh air damper only (not the mixing damper) the quantity of fresh air is not controlled.

| Mask index | Display description | Selection |
|---|---|---|
| Ha02 | Dampers type | 1: Fresh air (On/Off) ¦ 2: Fresh air (Mod) ¦3: Fresh air + Mixing ¦ 4: Fresh air + Mixing + Exhaust ¦ 5: Fresh air (Mod) + Exhaust |
| | Freecooling | 1: None ¦ 2: Temperature ¦ 3: Enthalpy |
| | Freeheating | 1: None ¦ 2: Temperature ¦ 3: Enthalpy |
| Hb39, Hb53 | Fresh air damper | Position ≠ 0 |
| Hb54 | Mixing damper | Position ≠ 0 |
| Hb55 | Exhaust damper | Position ≠ 0 |

## Activation by temperature

Note: the following graphs consider the outside temperature to be constant.

Freecooling and freeheating by temperature are activated when:

1. the outside temperature is closer to the temperature set point than the return temperature, or
2. the outside and return temperature straddle the set point.

FREECOOLING (cooling request active)

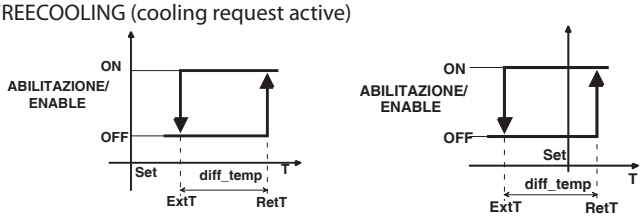



Fig. 8.j

ON: RetT- ExtT> diff_temp; OFF: RetT-ExtT<0

FREEHEATING (heating request active)

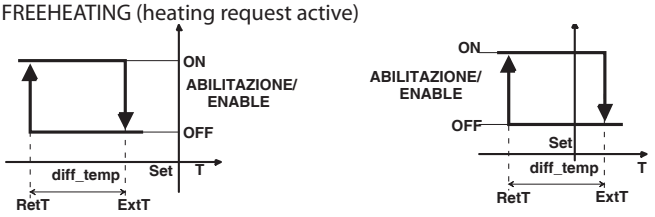



Fig. 8.k

ON: ExtT-RetT> diff_temp; OFF: ExtT-RetT<0

Key

| | | | |
|---|---|---|---|
| RetT | Return temperature | Set | Set point |
| ExtT | Outside temperature | diff_temp | Temperature differential |
| T | Temperature | | |

Note: for control by enthalpy, the same rules apply for activation, with the values calculated enthalpy based on the temperature and humidity set points and the outside air conditions, displayed on screen D06. In this case the enthalpy activation differential is fixed at 4 kJ/kg. See the following paragraph.

Temperature differentials are needed to determine whether it's efficient to sue freecooling/freeheating, considering that the higher the deviation between outside and return temperatures, the more efficient the function will be.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc15 | Freecooling/Freeheating dampers setting | | | | |
| | Temperature differential | 4 | 0 | 99.9 | °C |

## Temperature control

The control differentials used are those that apply to normal temperature control.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc05 | Cooling regulation | | | | |
| | Differential | 2 | 0 | 99.9 | °C |
| Gfc06 | Heating regulation | | | | |
| | Differential | 2 | 0 | 99.9 | °C |

When the function has been activated, the fresh air damper and mixing damper are controlled proportionally to the cooling/heating request with the percentages defined on Gfc20/ Gfc21. The fresh air damper opens and the mixing damper closes to compensate for the pressure drop. If the fresh air damper and exhaust damper are used, the two control signals are identical.

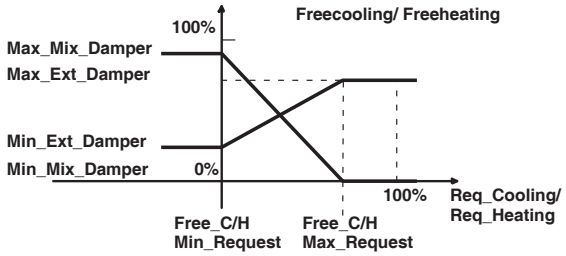



Fig. 8.l

Key

| | |
|---|---|
| Max_Mix_Damper | Mixing damper maximum opening |
| Max_Ext_Damper | Fresh air damper maximum opening |
| Min_Mix_Damper | Mixing damper minimum opening |
| Min_Ext_Damper | Fresh air damper minimum opening |
| Req_cooling/heating | Cooling/heating request |

The limits for opening the damper are set in the manufacturer parameters menu, Hc02.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc02 | Dampers limits setting | | | | |
| | Fresh air damper - min | - | 0 | 100 | % |
| | Fresh air damper - max | - | 30 | 100 | % |
| | Mixing damper - min | - | 0 | 100 | % |
| | Mixing damper - max | - | 0 | 100 | % |

To exploit freecooling/freeheating to the maximum, a delay can be set when starting the unit for activation of the other devices in cascade control.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc03 | Damper setting | | | | |
| | Coil start delay | 0 | 0 | 120 | min |

Note:

- if air quality control is also enabled (see. Ha02), when both functions are active the fresh air damper will open according to the higher request;
- in the winter season, freecooling is especially useful for cooling. A typical example a crowded shopping centre or conference centre. To do this, enable "auto" mode on Gfc04 and set the freecooling parameters accordingly.

## Activation by enthalpy

Note: the following graphs consider the outside enthalpy to be constant.

Freecooling and freeheating by enthalpy are activated when:

1. the outside enthalpy is closer to the enthalpy set point than the return enthalpy, or alternatively
2. the outside and return enthalpy straddle the set point.

FREECOOLING ENTHALPY

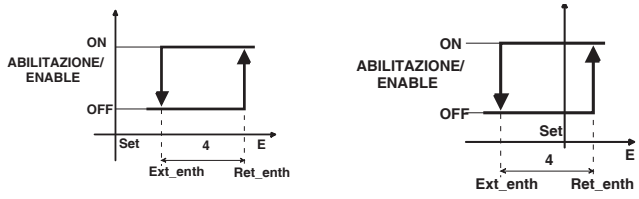



Fig. 8.m

ON: Ret_Enth- Ext_enth> 4; OFF: Ret_Enth-Ext_Enth<0

FREEHEATING ENTHALPY

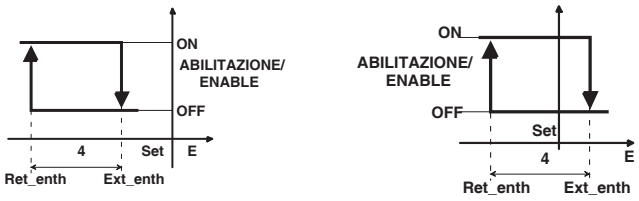



Fig. 8.n

ON: Ext_Enth-Ret_enth> 4; OFF: Ext_enth-Ret_Enth<0

Key

| | | | |
|---|---|---|---|
| Ret_enth | Return enthalpy | Set | Enthalpy set point |
| Ext_enth | Outside enthalpy | E | Enthalpy |

### Enthalpy control

The enthalpy control set point and supply, return and outside enthalpy values can be seen on screen D06. The control differential is set on screen Gfc15.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| D06 | Enthalpy | | | | |
| | Supply | - | 0 | 99.9 | kJ/kg |
| | Return | - | 0 | 99.9 | kJ/kg |
| | External | - | 0 | 99.9 | kJ/kg |
| | Setpoint | - | 0 | 99.9 | kJ/kg |
| Gfc15 | Freecooling/ Freeheating dampers settings | | | | |
| | Enthalpy differential | 5 | 0 | 99.9 | kJ/kg |

When the function has been activated, the fresh air damper and mixing damper are controlled proportionally to the freecooling/freeheating enthalpy request. The fresh air damper opens and the mixing damper closes to compensate for the pressure drop. If the fresh air damper and exhaust damper are used, the two control signals are identical.

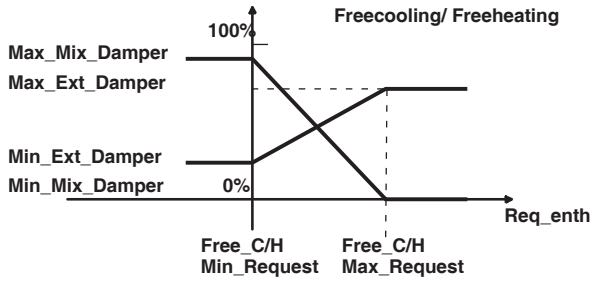



Fig. 8.as

Key

| | |
|---|---|
| Max_Mix_Damper | Mixing damper maximum opening |
| Max_Ext_Damper | Fresh air damper maximum opening |
| Min_Mix_Damper | Mixing damper minimum opening |
| Min_Ext_Damper | Fresh air damper minimum opening |
| Req_enth | Enthalpy request |

In the case of freecooling by enthalpy, the control request will depend on the deviation from the control set point. Control for freeheating by enthalpy is similar.

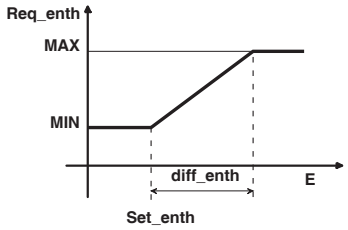



Fig. 8.at

Key

| | |
|---|---|
| Req_enth | Control request |
| diff_enth | Enthalpy control differential |
| Set_enth | Enthalpy set point |

## 8.9 Heat recovery

### Definition

If the AHU is fitted with a heat recovery unit, the heat contained in the exhaust air is recovered and transferred to the primary air so as to preheat or precool it, if the conditions are favourable: consequently freecooling/ freeheating and heat recovery are mutually exclusive. When the AHU is in heat recovery mode, the bypass damper on the heat recovery unit is closed.

In cascade control the request is shared between the various devices available. Heat recovery is thus considered a free source of energy free, activated with priority in cascade control in cooling and heating modes.

### Enabling

The heat recovery function can only be enabled if a heat recovery unit is installed and enabled. The bypass damper (Ha01) may not be necessary. Below is a list of possible combinations.

| Ha14 | Type of heat recovery | | | |
|---|---|---|---|---|
| Bypass damper | Cross flow | Run-around coil | Modulating rotary | On/Off rotary |
| No | YES | YES | YES | YES |
| On/Off | YES | YES | YES | YES |
| Modulating | YES | YES | NO | YES |

Tab. 8.c

ON/OFF DEVICES

| Screen index | Display description | Enable |
|---|---|---|
| Hb39 | Heat recovery unit pump (run-around coil) | Position ≠ 0 |
| | Heat wheel (ON/OFF) | Position ≠ 0 |
| | Bypass damper (ON/OFF) | Position ≠ 0 |

Tab. 8.d

MODULATING DEVICES

| | | |
|---|---|---|
| Hb63 | Heat wheel | Position ≠ 0 |
| Hb56 | Bypass damper (ON/OFF) | Position ≠ 0 |

Tab. 8.e

### Types of heat recovery unit

**Cross-flow heat recovery unit:** no dedicated output.

**Run-around coil heat recovery unit:** only one digital output is activated, which starts the pump. If the bypass damper has On/Off operation, activation of the pump will be the reverse to the damper. With modulating dampers, the pump will remain on while heat can be recovered and the bypass damper will modulate the quantity of heat recovered, depending on the request.

**Modulating heat wheel:** an analogue output is managed for modulation of wheel rotation speed and an On/Off output for the bypass damper. The heat recovery request acts directly on the wheel speed, which may have a minimum limit set. The bypass damper will be activated when no heat can be recovered.

**On/Off heat wheel:** an on/off output is managed to control the heat recovery unit. The bypass damper will be activated when no heat can be recovered.

| Mask index | Display description | Selection |
|---|---|---|
| Ha14 | Heat recovery type | 1: None ¦ 2: Plate exchanger ¦3: Run-around coil ¦ 4: Modulating rotary ¦ 5: On/Off rotary |

Note: with on/off or modulating heat wheels, heat can also be recovered by controlling the enthalpy conditions.

The function has two stages:
1. check whether the return temperature or enthalpy conditions are favourable compared to the outside air conditions;
2. the request of summer/winter acts on the speed of the heat wheel or on the modulating bypass damper.

## Activation

Note: the following graphs consider the outside temperature to be constant.

Heat recovery is activated when the return temperature is closer to the temperature set point than the outside temperature.

RECOVERY IN COOLING (cooling request active)

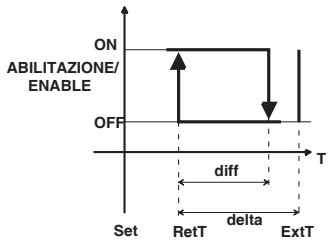



Fig. 8.o

ON: ExtT-RetT> delta_recov; OFF: ExtT-RetT< delta_recov – diff_recov

RECOVERY IN HEATING (heating request active)

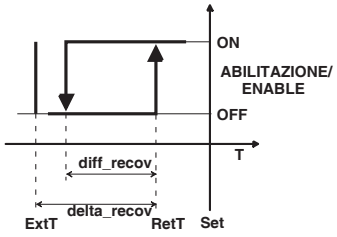



Fig. 8.p

ON: RetT-ExtT-> delta_recov; OFF: RetT-ExtT < delta_recov – diff_recov

Key

| | | | |
|---|---|---|---|
| diff_recov | Recovery differential | Set | Set point |
| RetT | Return temperature | delta_recov | Recovery delta |
| ExtT | Outside temperature | | |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc31 | Heat recovery temperature activation | | | | |
| | Delta recovery | 5 | 0 | 99.9 | °C |
| | Differential | 3 | 0 | 99.9 | °C |

Note: for heat recovery by enthalpy, only applicable to the wheel, the same rules apply for activation. The enthalpy delta is fixed at 4 kJ/kg and the differential is fixed at 2 kJ/kg.

Based on the efficiency of the heat recovery unit, a deviation (delta) must be set between the return and outside temperature. The more efficient the heat recovery unit, the lower the delta. The differential (diff_recov) is used to switch off the devices in advance, so as to reduce energy consumption, above all relating to operation of the heat wheel or pump for the run-around coil heat recovery unit. For heat recovery units consisting of a plate heat exchanger, on the other hand, flow through the heat exchanger increases pressure drop and consequently fan power consumption.

## Control

Control by temperature depends on the set point and the temperature differentials, based on the percentage of request reserved for the heat recovery unit. See the paragraph "Cascade control". As regards control by enthalpy, the control differential needs to be set, based on which the heat wheel rotation speed will vary. For run-around coil heat recovery units, the pump will be on or off according to the activation graphs shown in the previous paragraph.

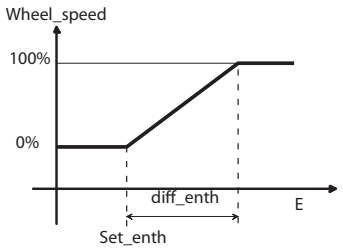



Fig. 8.q

Key

| | |
|---|---|
| Wheel_speed | Heat wheel speed |
| diff_enth | Enthalpy control differential |
| Set_enth | Enthalpy set point |
| E | Enthalpy |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc31 | Enthalpy regulation | | | | |
| | Differential | 5 | 0 | 99.9 | kJ/kg |

## Heat recovery unit frost protection function

The heat recovery unit frost protection function prevents problems due to frost forming on the heat recovery unit. The actions undertaken depend on the type of heat recovery unit: in any case, the bypass damper is fully open. Given that the exhaust air has a defrosting effect:
- the run-around coil heat recovery unit pump continues operating;
- the heat wheel continues operating.

## Activation and control

To enable the function, define the probe that measures the temperature, enable (optional) a defrost heater and define the activation set point and differential. For modulating heat wheels, the speed during frost protection can also be selected.

| Mask index | Display description | Selection |
|---|---|---|
| Ha14 | Heat recovery type | |
| | … | |
| | Defrost probe | None ¦ External-Return (*) ¦ Exhaust ¦ External |
| | Recovery heater | No ¦ Yes |
| Hb41 | Heater heat recovery unit | Position ≠ 0 |

(*)Arithmetic average between the 2 probes.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc32 | Heat recovery defrost | | | | |
| | Setpoint | -1 | -99.9 | 10 | °C |
| | Differential | 4 | 0 | 99.9 | °C |
| | Heater offset | 3 | 0 | 99.9 | °C |
| | Wheel min speed | 100 | 0 | 100 | % |
| Hc18 | Heat recovery | | | | |
| | Defrost delay | | | | |
| | Start | 120 | 0 | 999 | s |
| | End | 60 | 0 | 999 | s |
| | Clogged alarm delay | 60 | 0 | 300 | s |

Once the heat recovery unit frost protection alarm is activated, for example when the frost protection thermostat contact closes, a delay from the start of the signal and a delay from the end of the signal can be set.

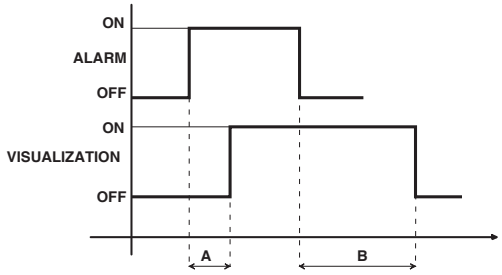



Fig. 8.r

Key

A Start B End

Below is a graph showing activation of the damper and frost protection heater, based on the defrost probe reading.

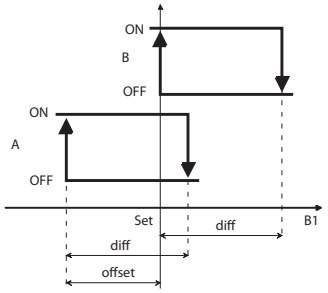



Fig. 8.s

Key

| | | | |
|---|---|---|---|
| A | Heat recovery unit frost protection heater | Set | Set point |
| B | Bypass damper | offset | Offset |
| B1 | Defrost probe | diff | Differential |

## 8.10 Cascade control

The cooling request and heating request can be shared between freecooling/ freeheating and the coil, and between the heat recovery unit and the coil.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc20 | Cooling cascade | | | | |
| | Freecooling | 50 | 0 | 100 | % |
| | Coil | 50 | 0 | 100 | % |
| | Recovery | 40 | 0 | 100 | % |
| | Coil | 40 | 0 | 100 | % |
| Gfc21 | Heating cascade | | | | |
| | Freeheating | 50 | 0 | 100 | % |
| | Coil | 50 | 0 | 100 | % |
| | Recovery | 40 | 0 | 100 | % |
| | Coil | 40 | 0 | 100 | % |

As regards heating, the heating request can be further shared between the preheating and reheating coils.

Note: overlapping operation of the preheating and reheating coils is also possible.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc22 | Heating cascade | | | | |
| | Reheating | 80 | % | 0 | 100 |

Example 1: partition of request between devices.

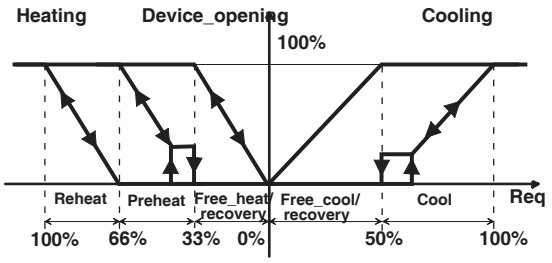



Fig. 8.t

Example 2: overlapping of preheating and reheating coils.

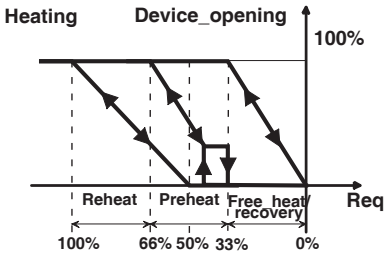



Fig. 8.u

Key

| | | | |
|---|---|---|---|
| Recovery | Recovery | Req | Request |
| Free_heat | Freeheating | Device_opening | Device activation |
| Preheat | Preheating coil valve | Reheat | Reheating coil valve |

## 8.11 Supply limits

### Definition

Note: the supply limits function can be activated (Gfc04) only if the control probe is the return probe or room probe .

The algorithm is used to correct the action of the main control function to return within acceptable values for the supply temperature. For example, if the fresh air damper opens to satisfy a air quality request, this attenuates the request on the actuators (e.g. heating coil, humidifier) so as to mitigate the effect on the supply temperature and humidity. Without this function, the supply air may cause discomfort (e.g. too hot or too cold) near the air inlets. The function can be activated on either the minimum or maximum temperature or humidity. There are two possible cases: action concordant with or contrasting against control.

### Temperature limits with concordant action

**Example of operation in heating mode (winter):** when the control set point is reached and the heating coil stops heating, an air quality request causes the fresh air damper to open and consequently the air supply temperature decreases. To prevent the temperature measured by the control probe from changing further, when the air supply temperature is less than minimum allowed limit the heating coil is activated, with proportional or PI control, according to the following graph, where the total request is 50%.

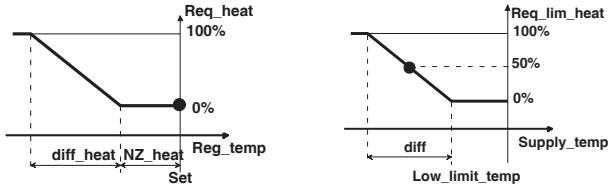



Fig. 8.v

0 % + 50 % = 50 %

Key

| | | | |
|---|---|---|---|
| Req_lim_ heat | Additional heating request | Reg_temp | Control probe temperature |
| NZ_heat | Neutral zone in heating | Supply_temp | Supply probe temperature |
| Diff_heat | Heating differential | Diff | Supply limit differential |

The behaviour is similar in cooling mode (summer).

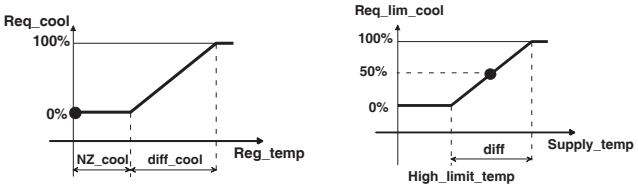



Fig. 8.w

0 % + 50 % = 50 %

Key

| | | | |
|---|---|---|---|
| Req_lim_cool | Additional cooling request | Reg_temp | Control probe temperature |
| NZ_cool | Neutral zone in cooling | Supply_temp | Supply probe temperature |
| Diff_cool | Cooling differential | Diff | Supply limit differential |
| High_limit_ temp | High temperature limit | | |

| Mask index | Display description | Selection |
|---|---|---|
| Gfc04 | Temperature regulation | |
| | Auto cool/heat | No ¦ Yes |
| | Supply limits | None ¦ High ¦ Low ¦ |
| High/low | | |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc07 | Temperature supply limits | | | | |
| | Summer high | 40 | -99.9 | 99.9 | °C |
| | Winter high | 40 | -99.9 | 99.9 | °C |
| | Summer low | 10 | -99.9 | 99.9 | °C |
| | Winter low | 10 | -99.9 | 99.9 | °C |
| | Differential | 3 | 0 | 99.9 | °C |
| | Integral time | 150 | 0 | 999 | s |

## Humidity limits with concordant action

Example of operation in humidification mode: when the control set point is reached and humidification ends, an air quality request causes the fresh air damper to open and consequently the supply humidity may decrease. To prevent the humidity measured by the control probe from changing further, when the supply air humidity is less than minimum allowed limit, the humidifier is activated, with proportional or PI control, according to the following graph, where the total request is 50%.

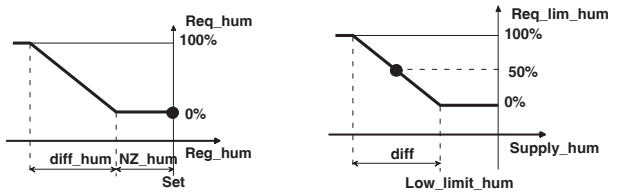



Fig. 8.x

0% + 50% = 50%

Key

| | | | |
|---|---|---|---|
| Req_lim_hum | Additional humidification request | Reg_hum | Control probe humidity |
| NZ_hum | Neutral zone in humidification | Supply_hum | Supply probe humidity |
| Diff_hum | Humidification differential | Diff | Supply limit differential |
| Low_limit_hum | Low humidity limit | | |

The behaviour is similar in dehumidification mode

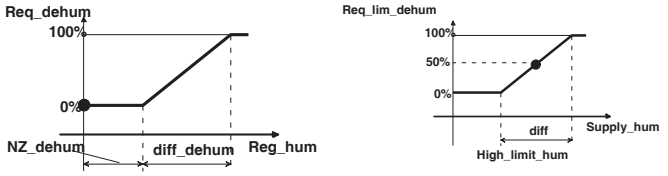



Fig. 8.y

0% + 50% = 50%

Key

| | | | |
|---|---|---|---|
| Req_lim_dehum | Dehumidification request for limit | Reg_hum | Control probe humidity |
| NZ_dehum | Neutral zone in dehumidification | Supply_hum | Supply probe humidity |
| Diff_dehum | Dehumidification differential | Diff | Supply limit differential |
| High_limit_hum | High humidity limit | | |

| Mask index | Display description | Selection |
|---|---|---|
| Gfc10 | Humidity regulation | |
| | Auto hum/dehum | No ¦ Yes |
| | Supply limits | None ¦ High ¦ Low ¦ |
| High/low | | |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc13 | Humidity supply limits | | | | |
| | High limit | 100 | 0 | 100 | % RH |
| | Low limit | 0 | 0 | 100 | % RH |
| | Differential | 4 | 0 | 100 | % RH |
| | Integral time | 150 | 0 | 999 | s |

## Temperature/humidity limits with contrasting action

Example of operation in heating mode (winter): the temperature measured by the control probe moves away from the set point (A) and reaches point B; the heating coil is then activated at 60%. If the temperature measured by the supply probe reaches point C, a control function is activated that limits the request signalled to the heating coil to 10% (60%-50%).

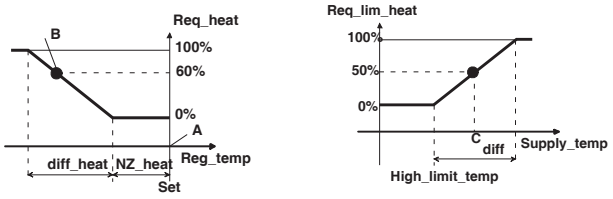



Fig. 8.z

60% - 50% = 10%

Key

| | | | |
|---|---|---|---|
| Req_lim_heat | Heating request for limit | Reg_temp | Control probe temperature |
| NZ_heat | Neutral zone in heating | Supply_ | |
| temp | Supply probe temperature | | |
| Diff_heat | Heating differential | Diff | Supply limit differential |

If double action is enabled, the action of the heating device will be limited until complete deactivation after the differential, when the cooling device will be activated.

| Mask index | Display description | Selection |
|---|---|---|
| Gfc07 | Temperature supply limits | |
| | Enable double action | No ¦ Yes |

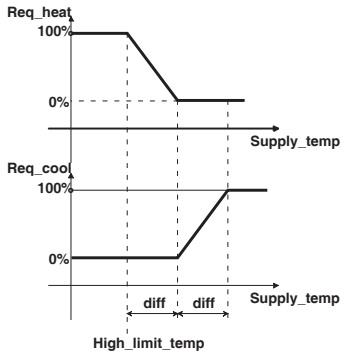



Fig. 8.aa

Key

| | | | |
|---|---|---|---|
| Req_heat | Heating request | Reg_temp | Control probe temperature |
| Diff | Supply limit differential | Supply_temp | Supply probe temperature |
| High_limit_temp | High temperature limit | | |

The function is similar in:
1. cooling;
2. humidification;

**Note**: the limiting action acts on the request signal. Therefore, the devices involved depend on the cascade control function described in point 8.10. For example, on an AHU in heating operation with auto mode enabled, in summer may operate with freecooling only: the supply limit is thus applied to avoid letting in outside air that is too cold.

## 8.12 Coils water temperature limits

To avoid opening of valves on the coils when the water temperature has not exceeded a minimum limit, the "Coil temperature limits" function can be enabled, available for every type of coil with its own set point and differential.

| Mask index | Display description | Selection |
|---|---|---|
| Hc09 | Enable preheating coil water temperature threshold | 0:No¦ 1:Yes |
| Hc11 | Enable cooling coil water temperature threshold | 0:No¦ 1:Yes |
| Hc14 | Enable heat/cool coil water temperature threshold | 0:No¦ 1:Yes |
| Hc16 | Enable reheating coil water temperature threshold | 0:No¦ 1:Yes |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc09 | Enable preheating coil water temperature threshold | | | | |
| | Threshold | 25 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 99.9 | °C |
| Hc11 | Enable cooling coil water temperature threshold | | | | |
| | Threshold | 35 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 9.9 | °C |
| Hc14 | Enable heat/cool coil water temperature threshold | | | | |
| | Hot threshold | 25 | -99.9 | 99.9 | °C |
| | Cool threshold | 35 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 9.9 | °C |
| Hc16 | Enable reheating coil water temperature threshold | | | | |
| | Threshold | 25 | -99.9 | 99.9 | °C |
| | Differential | 2 | 0 | 99.9 | °C |

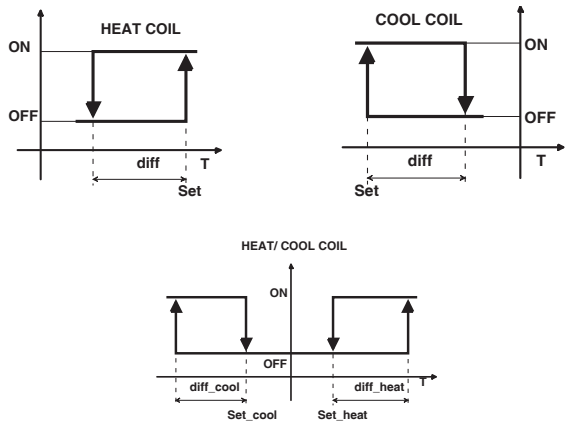



Fig. 8.au

Note: when season changeover is enabled based on the water temperature, the heating/cooling coil temperature limit is set on Hb16 and the switching threshold on Gc03.

| Mask index | Display description | Selection |
|---|---|---|
| Gc01 | Season selection from | H2O temperature |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gc03 | Season threshold | | | | |
| | Summer | 25 | -99.9 | 99.9 | °C |
| | Winter | 30 | -99.9 | 99.9 | °C |

## 8.13 Pump management

Up to two pumps are managed, with rotation and alarms. The corresponding functions concern:

1. automatic rotation between the pumps to equally share the work load and operating hours between pumps. This is activated:
   - when a certain period of time expires;
   - when a thermal overload alarm is activated or there is no flow on one of the two pumps;
2. antiblock management, with temporary activation of the pump when the system is not used for long periods;
3. frost protection by starting the pump to circulate fluid.

The pumps are enabled as devices and consequently the number needs to be defined. For the explanations of the other parameters, see "Rotation between two pumps" and "Pump alarms".

| Mask index | Display description | Selection |
|---|---|---|
| Ha09 | Enable water pumps Cooling-Cool/heat | 0:No¦ 1:Yes |
| | Preheating | 0:No¦ 1:Yes |
| | Reheating | 0:No¦ 1:Yes |
| | Enable flow feedback | 0:No¦ 1:Yes |

| Mask index | Display description | Def | Min | Max | U.M |
|---|---|---|---|---|---|
| Ha10 | Cooling – cool/ heat pumps | | | | |
| | Number of pumps | 2 | 1 | 2 | - |
| | Warning limit | 3 | 0 | 5 | - |
| | Enable antiblock | Yes | 0 | 1 | - |
| Ha11 | Preheating pumps | | | | |
| | Number of pumps | 2 | 1 | 2 | - |
| | Warning limit | 3 | 0 | 5 | - |
| | Enable antiblock | Yes | 0 | 1 | - |
| Ha12 | Reheating pumps | | | | |
| | Number of pumps | 2 | 1 | 2 | - |
| | Warning limit | 3 | 0 | 5 | - |
| | Enable antiblock | Yes | 0 | 1 | - |
| Hc17 | Pumps | | | | |
| | Alarm flow delay | 30 | 1 | 999 | s |
| | Start | 15 | 1 | 999 | s |
| | Pumps rotation time | 96 | 0 | 999 | hour |
| | Overwork time | 0 | 0 | 999 | s |

### Rotation between two pumps

When one pump has operated for the time defined by "Rotation time", operation of the pumps is rotated. "Overlapping time" can be used to manage the changeover sequence between pumps:

| OVERLAPPING TIME | | |
|---|---|---|
| >0 | =0 | <0 |
| Active pump stop delay | Pump ON stops and pump OFF starts | Pump OFF start delay (*) |
| (*) During the overlapping time no pump is on. | | |

### Pump alarms

There are two types of alarm:

- in the event of overload alarms, the alarm is signalled and the pump stops immediately. If a second pump is available operation is rotated;
- in the event of flow alarms, a warning signal is sent until the pump stops completely. If a second pump is available operation is rotated. Each pump sends a number of malfunction signals equal to the "Warning limit" before the no flow alarm is activated. This alarm has a delay from when absence of flow is measured, and differs depending on whether the pump is starting or is in steady operation.

In the following example the alarm is activated after two warnings.

Note:

- the number of warnings is reset as soon as water flow is measured and is automatic;
- the warning remains active during the attempts to restore pump flow;
- as soon as the alarm is activated the warning is automatically reset;
- when there is an active warning, the pump stays off for a set time. Only after this time interval can the pump start again, repeating the start-up procedure: the warning is reset only flow is measured and the pump is on;
- if the number of attempts to restore flow is 0, the alarm is activated immediately and no attempt is performed to restore flow;
- also see the documents on pump module in 1tool.

EXAMPLE

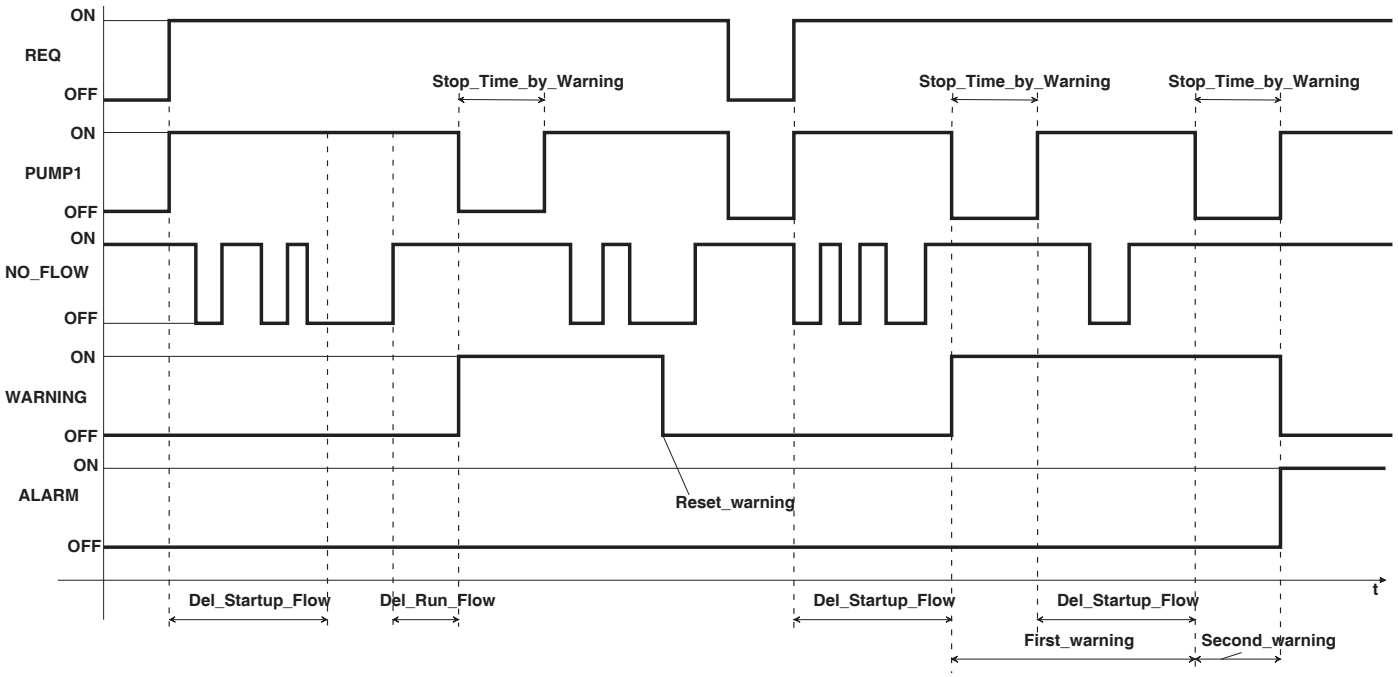



Fig. 8.ab

Key

| | | | |
|---|---|---|---|
| REQ | Request | Del_Startup_flow | Flow alarm delay in start-up |
| PUMP1 | Pump | Del_Run_Flow | Flow alarm delay in steady operation |
| ALARM | Alarm | | |

## 8.14 Cooling devices

The following cooling devices are managed (Ha06):
- valves: 0 to 10 V with one analogue output
- floating valves, with two relays outputs, one for the open command and one for closing;
- direct expansion: stepped control, calling the condenser only without management of the refrigeration cycle.

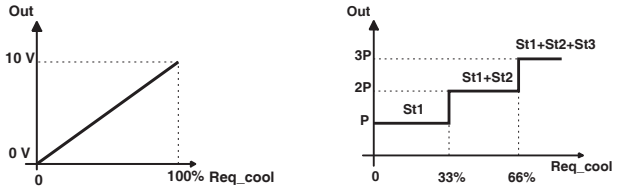



Fig. 8.ac

Key

| | | | |
|---|---|---|---|
| Req_cool | Cooling request | St1 to 3 | Step 1 to 3 |
| P | Capacity | | |

Note: the total cooling request is divided between the various cascade control devices, based on the PID control parameters, and is affected by the supply limits.

## 8.15 Heating devices

The following heating devices are managed (Ha05, Ha08):
- valves: 0 to 10 V with one analogue output
- floating valves, with two relays outputs, one for the open command and one for closing;
- heaters.

Note: the total heating request is divided between the various cascade control devices, based on the PID control parameters, and is affected by the supply limits.

The heaters may be on/off or modulating, for the selection see parameter Ha05.

| Mask index | Display description | Selection |
|---|---|---|
| Ha05 | Heaters type | On/Off ¦ Modulating ¦ On/Off binary |

The type of control depends on the number of heaters:
1. Modulating: see the graph in the previous paragraph;
2. ON/OFF;
3. ON/OFF binary (for 2 heaters only): if the heaters are suitably sized (R1 with power P and R2 with power 2P) the controller can deliver capacity in steps from 0 to 3P (figure).

PREHEATING HEATERS

| | |
|---|---|
| Type | ON/OFF, Modulating, ON/OFF binary |

ON/OFF BINARY CONTROL FOR 2 HEATERS

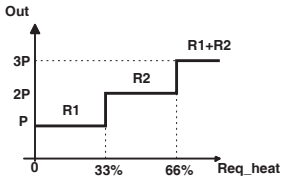



Fig. 8.ad

Key

| | | | |
|---|---|---|---|
| P | Power | R1,2 | Heater 1, 2 |
| Req_heat | Heating request | | |

If control is modulating and there is one heater, this will be controlled by a digital output plus 1 analogue output for modulation, while if there are from 2 to 4 heaters (with the same power rating) modulation will only be applied to one heater (1 digital output + 1 analogue output) and the remaining heaters will be controlled by digital outputs only.

| OUTPUTS FOR MODULATING HEATER CONTROL | | |
|---|---|---|
| NO. OF HEATERS | DIGITAL OUTPUTS | ANALOGUE OUTPUTS |
| 1 | 1 | 1 |
| 2 | 2 | 1 |
| 3 | 3 | 1 |
| 4 | 4 | 1 |

Tab. 8.f

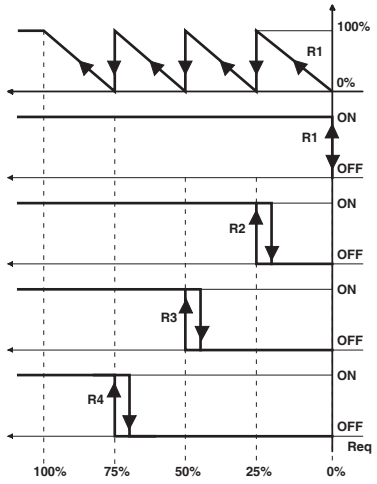



Fig. 8.ae

Key

| | | | |
|---|---|---|---|
| Req | Request | R1 to R4 | Heater 1 to 4 |

## 8.16 Cooling devices

The following cooling devices are managed (Ha06):

- valves: 0 to 10 V with one analogue output
- floating valves, with two relays outputs, one for the open command and one for closing;
- direct expansion: stepped control, calling the condenser only without management of the refrigeration cycle.

Note: the total cooling request is divided between the various cascade control devices, based on the PID control parameters, and is affected by the supply limits.

| Mask index | Display description | Def | Min | Max | U.M. |
|---|---|---|---|---|---|
| Hc03 | Damper setting | | | | |
| | Opening time | 120 | 0 | 9999 | s |
| | Closing delay | 120 | 0 | 9999 | s |

On screen Ha01, can you select if fans are presents in:

- supply;
- supply+return.

When the number of fans are selected, select the type:

TYPE OF FAN CONTROL

| Selection | Type of control | Outputs envisaged (*) | |
|---|---|---|---|
| | | DIG | AN |
| Inverter | Air quality | 1 | 1 |
| | Static pressure | | |
| On-off (double) | Two fans installed in parallel to modify the ventilating section. Same control as direct starting with delay set between the two | 2 | - |
| On-off (star – delta) | Same as direct starting with setting of contactor digital outputs | 3 | - |
| On-off (direct starting) | Fan start-up linked only to unit power-on | 1 | - |
| On-off (backup fan) | Pair of fans where one is the backup for the other in the event of faults (flow, thermal overload alarm) | 2 | - |
| On-off (2 speed) | Speed 1. Unit ON<br>2. Air quality request | | |

Tab. 8.g

(*) if only supply fan fitted. Double the number of outputs with supply and return air fans.

### On/Off fans with direct and star-delta starting

The fans are started when the unit is powered up. For starting, as well as the fan outputs, the outputs for the 3 contactors also need to be enabled (see the figure)

1. Supply/return air fan line (K1)
2. Supply/return air fan star (K3);
3. Supply/return air fan delta (K2)

The switching delay time also needs to be set.

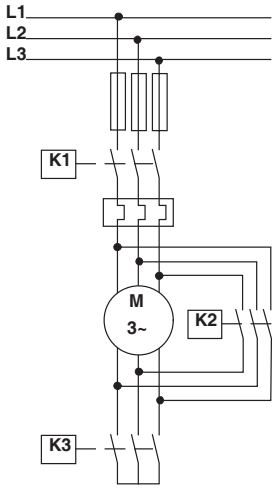



Fig. 8.af

| Mask index | Display description | Selection |
|---|---|---|
| Ha03 | Fan type | 1: On-Off(direct start) ¦ 2: On-Off(star-delta) ¦ 3: On-Off (double) ¦ 4: Inverter ¦ 5: On-Off(2 speed) ¦ 6: On-Off (duty standby) ¦ |
| Hb37 | Star-delta logic | |
| | Supply fan line | position ≠0 |
| | Supply fan star | position ≠0 |
| | Supply fan delta | position ≠0 |
| Hb37 | Return fan line | position ≠0 |
| | Return fan star | position ≠0 |
| | Return fan delta | position ≠0 |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc04 | Fans Star-Delta timing | | | | |
| | Star-line | - | 0 | 99 | ms |
| | Star | - | 0 | 99 | ms |
| | Star-delta | - | 0 | 99 | ms |

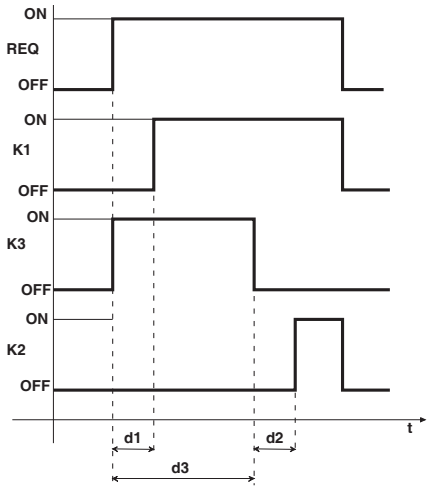



Fig. 8.ag

Key

| | | | |
|---|---|---|---|
| REQ | Fan request | | |
| K1 | Fan line | K2 | Fan delta |
| K3 | Fan star | d1 | Line – star delay |
| d2 | Star-delta delay | d3 | Star time |

## Double On/Off fans

This is when there are two fans fitted in parallel, to modify the ventilating section. Activation again depends on unit power-on, however a delay is available between activation of the first and second fan (supply – return).

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc06 | Fans timing | | | | |
| | Stop delay | 30 | 0 | 999 | s |
| | Supply-return | 0 | 0 | 999 | s |

## Fans with inverters

If the fans are controlled by inverter, three types of control can be selected:

| Mask index | Display description | Selection |
|---|---|---|
| Ha03 | Fan type | 1: Static pressure ¦ 2: Air quality ¦ 3: Fixed speed |

1. Static pressure: on unit power-up the fan operates at minimum speed and then tries to reach the differential pressure set point, with the PID parameters set.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc17 | Supply inverter | | | | |
| | Minimum/fixed power | 30 | 0 | 100 | % |
| | Max power | 100 | 0 | 100 | % |
| | Return inverter | | | | % |
| | Minimum/fixed power | 30 | 0 | 100 | % |
| | Max power | 100 | 0 | 100 | % |
| Gfc18 | Supply flow control | | | | |
| | Setpoint | 1500 | 0 | 2000 | Pa |
| | Differential | 300 | 0 | 1000 | Pa |
| | Integral time | 300 | 0 | 1000 | s |
| | Derivative time | 10 | 0 | 9999 | s |
| Gfc19 | Return flow control | | | | |
| | Setpoint | 1500 | 0 | 2000 | Pa |
| | Differential | 300 | 0 | 1000 | Pa |
| | Integral time | 300 | 0 | 1000 | s |
| | Derivative time | 10 | 0 | 9999 | s |

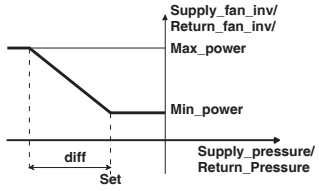



Fig. 8.ah

Key

| | |
|---|---|
| Supply_pressure/ return pressure | Supply/ return pressure |
| Supply_fan_inv/ Return_fan_inv | Supply / return fan inverter request |
| Min_power | Minimum power |
| Max_power | Maximum power |

2. Air quality: on unit power-up the fan tries to satisfy the request.

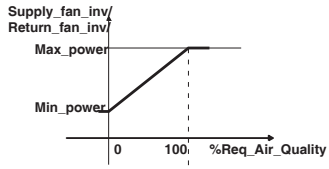



Fig. 8.ai

3. Fixed speed: control is completely disabled and the fan operates at a fixed speed.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc17 | Supply inverter | | | | |
| | Minimum/fixed power | 30 | 0 | 100 | % |
| | Return inverter | | | | % |
| | Minimum/fixed power | 30 | 0 | 100 | % |

## On/Off fans with backup

This configuration features a pair of fans, where one is backup for the other in the event of flow or excess temperature alarms. If activated (Ha04), there are two overload alarms for the supply fans and two for the return fans. The flow alarm, on the other hand, uses one device (pressure switch/flow switch or differential probe) for the supply fans and one device for the return fans. A rotation time can be set between the two fans and backup fan activation can be brought forward/delayed by setting the overlapping time >/<0.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc06 | Fans timing | | | | |
| | Stop delay | 30 | 0 | 999 | s |
| | Supply-return | 0 | 0 | 999 | s |
| | Rotation time | 0 | 0 | 999 | h |
| | Overworking time | 0 | -99 | 99 | s |

## Two speed fans

In this case a two-speed fan can be installed, where the first is activated when the unit starts (supply/return air fan 1) and the second is activated due to an air quality request (supply/return air fan 2).

| Mask index | Display description | Selection |
|---|---|---|
| Hb35 | Supply fan | |
| | Position | ≠0 |
| | Logic | NC, NO |
| Hb36 | Supply fan 2 | |
| | Position | ≠0 |
| | Logic | NC, NO |

If activated (Ha04), one thermal overload alarm is available for the supply fan and one thermal overload alarm for the return fan.

## Fan alarms

The alarms due to excess temperature or no flow are enabled on screen Ha04. The thermal overload alarm is only signalled via a digital input, connected for example to a suitably calibrated thermostat. The flow alarm can be generated by a pressure switch/flow switch or by a differential pressure probe.

| Mask index | Display description | Selection |
|---|---|---|
| Ha04 | Fan alarms | |
| | Overload | 1: None ¦ 2: Supply ¦ 3: Supply + return |
| | Air flow | 1: None ¦ 2: Supply ¦ 3: Supply + return |
| | Air flow from | 0: Pressure switch ¦ 1: Transducer |
| | Stop action | 0: Individual ¦ 1: All |
| Hb27 | Supply flow control | |
| | Position | ≠0 |
| | Logic | NC, NO |
| | Return flow control | |
| | Position | Position |
| | Logic | Logic |
| Hb09 | Supply pressure position | |
| | Position | |
| | Type | 4 to 20 mA ¦ 0 to 1 V ¦ 0 to 10 V |
| | Min limit | |
| | Max limit | |
| Hb09 | Return pressure position | |
| | Position | |
| | Type | 4 to 20 mA ¦ 0 to 1 V ¦ 0 to 10 V |
| | Min limit | |
| | Max limit | |

**Note**: if the alarms involve the supply fan (Ha04), the control devices that are stopped are those on the supply.

A delay when starting and a delay in steady operation can be set for the flow alarm. The alarm has automatic reset until reaching the set number of attempts and subsequently has manual reset. The flow alarm stops the fan for a certain fixed time before attempting to start it again. In the case of backup fans, the second fan will be activated immediately, if available.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc05 | Flow alarm threshold | | | | |
| | Supply | 100 | 0 | 9999 | Pa |
| | Return | 100 | 0 | 9999 | Pa |
| | Differential | 300 | 0 | 9999 | Pa |
| Hc07 | Fans flow alarm | | | | |
| | Start-up delay | 20 | 1 | 999 | s |
| | Running delay | 5 | 1 | 999 | s |
| | Flow warning retries | 0 | 0 | 5 | - |

## 8.17 Air quality

### Definition

CO2 and/or VOC (Volatile Organic Compound) probes can be used to monitor air quality and if necessary increase the flow-rate of fresh air to increase the concentration of oxygen.

### Enabling

The air quality control function can only be enabled if the mixing damper is fitted or the fan features modulating operation. The type of control can be selected between proportional or proportional+integral.

| Mask index | Display description | Selection |
|---|---|---|
| Ha02 | Dampers type | Fresh air+mixing ¦ Fresh air+mixing+exhaust |
| | Enable air quality management | Yes |
| Ha03 | Fan type | inverter |
| | Fan regulation | Air quality |
| Ha15 | Air quality | |
| | Regulation type | Proportional ¦ P+I |
| | Air quality: Probe type | CO2 ¦ CO2+VOC ¦ VOC |
| Hb13 | CO2 air quality | Position ≠ 0 |
| Hb14 | VOC air quality | Position ≠ 0 |

Note:

- if both probes (CO2+VOC) are set, the active request will be the higher of the two;
- setting fan control to air quality automatically enables the function. With other settings, to enable quality control, set the corresponding parameter on Ha02.

### Control

Once the type of probe has been selected, the set point and differential need to be defined for each function. For P+I control, also set the integral time.

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc30 | Air quality with CO2 | | | | |
| | Setpoint | 1200 | 0 | 5000 | ppm |
| | Differential | 200 | 0 | 5000 | °C |
| | Air quality with VOC | | | | |
| | Setpoint | 50 | 0 | 100 | % |
| | Differential | 10 | 0 | 100 | % |
| Hc19 | Integral time | 300 | 9999 | | s |

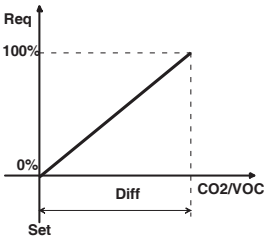



Fig. 8.aj

Key

| | | | |
|---|---|---|---|
| CO2/VOC | CO2/VOC probe | Req | Air quality request |
| Set | CO2/VOC air quality set point | | |
| Diff | CO2/VOC air quality differential | | |

Based on the request, first the fresh air damper output will be increased and then the fan output (cascade control).

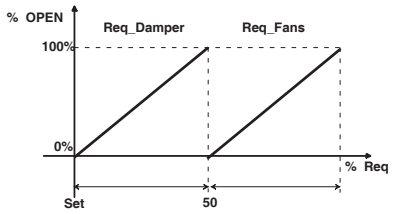



Fig. 8.ak

Key

| | |
|---|---|
| Set | Air quality set point |
| Req_Fans | Fan request |
| Req_Damper | Fresh air damper request |
| Req | Air quality request |

Note: the fan request from 0 to 100 % varies the fan speed between minimum and maximum.

The maximum and minimum limits for the mixing and fresh air dampers are set on Hc02. Based on the percentage of the air quality request, the dampers will operate with the following trend. The exhaust damper, if available, follows the trend of the fresh air damper. For ON/OFF dampers, maximum corresponds to ON and minimum to OFF.

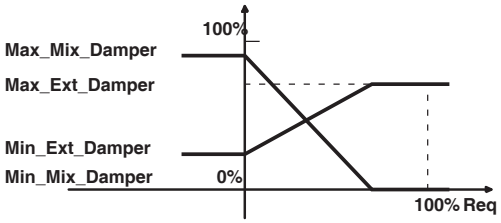



Fig. 8.al

Key

| | |
|---|---|
| Req | Air quality request |
| Min_Mix_Damper | Mixing damper minimum limit |
| Max_Mix_Damper | Mixing damper maximum limit |
| Min_Ext_Damper | Fresh air damper minimum limit |
| Max_Ext_Damper | Fresh air damper minimum limit |

Nota: opening the fresh air damper involves proportionally closing the mixing damper, respecting the corresponding minimum and maximum limits. If a freecooling/freeheating request is also active, the fresh air damper will open based on the higher of the two.

## 8.18 Purging

### Definition

Air purging, once enabled, manually forces fresh air into the room for a set time.

### Enabling

The following are possible:

1. enable the purge function manually only if the mixing damper is installed and the function is enabled;
2. automatically activate the function at start-up (based on the scheduler).

| Mask index | Display description | Selection |
|---|---|---|
| Ha15 | Enable purging | 0: No ¦ 1: Yes |
| Gg02 | Air quality | |
| | Start purging | No ¦ Yes |
| | Stop purging | No ¦ Yes |
| | Resume time | ---min |
| | Repeat at start-up | No ¦ Yes |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Hc19 | Cleaning time | 10 | 0 | 300 | min |

### Control

During the purge function, the fresh air damper is fully opened to assist the

inlet of fresh air and the fan is operated at maximum speed.

Note: in the status of frost protection the function is disabled.

## 8.19 Frost protection

### Unit frost protection

This can be activated by thermostat, probe or thermostat and probe together. If activated by thermostat, the "Frost protection alarm" digital input is configured on Hb25, if activated by probe the frost protection probe analogue input is configured on Hb11; the set point and differential are set on Gfc33.

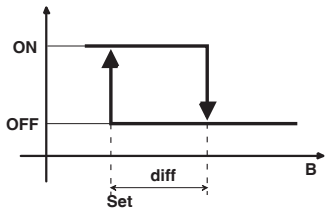



Fig. 8.am

Key

| | | | |
|---|---|---|---|
| Set | Frost protection set point | B | Frost protection probe |
| diff | Frost protection differential | | |

| Mask index | Display description | Selection |
|---|---|---|
| Ha16 | Frost protection | 1: none ¦ |
| | | 2: by frost-stat ¦ |
| | | 3: by probe ¦ |
| | | 4: by probe+frost-stat |
| Hb11 | Frost temperature position | position ≠0 |
| | | type: NTC ¦ PT1000 |
| Hb25 | Frost-stat | position ≠0 |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc33 | Frost temperature position | | | | |
| | Setpoint | 5 | -99.9 | 99.9 | °C |
| | Differential | 3 | 0 | 99.9 | °C |

If the frost protection probe measures a temperature less than Set+diff, the controller activates "Frost protection prevention" mode, with the icon shown on the display: the preheating coil capacity is increased gradually. The fresh air damper is closed gradually however only if the mixing damper is installed. The controller exits "frost protection prevention" mode when the temperature exceeds Set+diff.

If, on the other hand, the temperature continues falling and the frost protection probe value is less than Set, the frost protection alarm is activated, with automatic reset. The display continues showing the icon. The controller:

1. 1) stops the fans;
2. 2) closes the dampers;
3. 3) activates the preheating coil at 100%;
4. 4) activates the cooling coil at 50%;
5. 5) activates all the pumps.

If, as a consequence of these actions, the frost protection probe measures a temperature greater than Set+diff, the controller exits frost protection mode.

Note:

- unit frost protection is also active when the unit is OFF;
- frost protection by thermostat only features the alarm with automatic reset;
- for alarms from probe +thermostat, use the thermostat as a safety device and calibrate it to lower temperature than the frost protection set point.

### Room frost protection

The room probe must be enabled on Hb04. The set point is then set on Gfc34. The differential is fixed at 3°C.

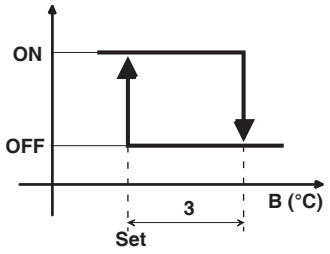



Fig. 8.an

Key

| | | | |
|---|---|---|---|
| Set | Room frost protection set point | B | Room probe |

| Mask index | Display description | Selection |
|---|---|---|
| Hb04 | Room temperature | Position ≠ 0 |
| Gfc34 | Room frost protection enable | No ¦ Yes |

| Mask index | Display description | Def | Min | Max | UOM |
|---|---|---|---|---|---|
| Gfc34 | Setpoint | 5 | -99.9 | 99.9 | °C |

If the room temperature is less than the set point and the controller is OFF:

- the display shows frost protection as being active;
- the controller starts operating as if it were ON, based on the control probe reading

## 8.20 Auxiliary control

Four auxiliary control loops can be enabled, each with its probe, P, PI or PID control and activation. The set points, differentials and integral times can be displayed on screens B11 to B14.

| Mask index | Display description | Selection |
|---|---|---|
| Ha19 | Auxiliary regulation loop | None, 1 to 4 |
| Ha20 to Ha23 | Regulation loop 1 | |
| | Regulation type | Direct ¦ inverse |
| | Output type | Modulating +on/off ¦ on/off ¦ modulating |
| | Other management | None ¦ on with supply fan |
| | | ¦ Force with frost protection |
| Hb19 to 22 | Regulation probe loop 1 to 4 | |
| | Position | ≠0 |
| | Type | NTC ¦ PT1000 ¦ 0 to 1 V ¦ 0 to 10 V ¦ 4 to 20 mA |
| Gfc36 to 39 | Regulation loop 1 to 4 | |
| | Setpoint | |
| | Differential | |
| | Integral time | |

# 9. PARAMETERS TABLE

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Address |
|---|---|---|---|---|---|---|---|---|---|---|
| A. On/Off Unit | | | | | | | | | | |
| A01 | Unit status | | 0 | - | 0 | 4 | 0: OFF<br>¦ 1: COMFORT<br>¦ 2: PRECOMFORT<br>¦ 3: ECONOMY<br>¦ 4: AUTO | I | R/W | 12 |
| | Reset time???? | | 4 | Hour | 0.5 | 16 | | I | R | - |
| | Override for | | - | Hour | 0.5 | 16 | | I | R | - |
| | Enable auto-resume | | No | - | No | Yes | 0:No¦ 1:Yes | I | R/W | - |
| B. Setpoint | | | | | | | | | | |
| | Temperature | Current temperature set point | 0 | °C | -99.9 | 99.9 | | A | R | 93 |
| | Humidity | Current humidity set point | 0 | % RH | 0 | 100 | | I | R | 13 |
| B01 | External compensation | Enable: Gfc08-Gfc09<br>Config.: Hb03 | 0 | °C | -99.9 | 99.9 | | A | R | - |
| | AIN Offset | Enable: Ha19<br>Configure: Hb23 | 0 | °C | -99.9 | 99.9 | | A | R | 25 |
| B02 | Comfort temp. Summer | Comfort room temp. set point (cooling) | 23 | °C | Min. temp. set limit in cooling (Gfc02) | Max. temp. set limit in cooling (Gfc02) | | A | R/W | 94 |
| | Comfort temp. Winter | Comfort room temp. set point (heating) | 23 | °C | Min. temp. set limit in heating (Gfc02) | Max. temp. set limit in heating (Gfc02) | | A | R/W | 95 |
| | Comfort humid. Summer | Comfort room humidity set point (cooling) | 50 | % RH | Min. humid. set limit in cooling (Gfc03) | Max. humid. set limit in cooling (Gfc03) | | I | R/W | 14 |
| | Comfort humid. Winter | Comfort room humidity set point (heating) | 50 | % RH | 0 | 100 | | I | R/W | 15 |
| B03 | Pre-comfort temp. Summer | Precomfort room temp. set point (cooling) | 25 | °C | Min. temp. set limit in cooling (Gfc02) | Max. temp. set limit in cooling (Gfc02) | | A | R/W | 96 |
| | Pre-comfort temp. Winter | Precomfort room temp. set point (heating) | 21 | °C | Min. temp. set limit in heating (Gfc02) | Max. temp. set limit in heating (Gfc02) | | A | R/W | 97 |
| | Pre-comfort humid. Summer | Precomfort room humidity set point (cooling) | 55 | % RH | 0 | 100 | | I | R/W | 16 |
| | Pre-comfort humid. Winter | Precomfort room humidity set point (heating) | 45 | % RH | 0 | 100 | | I | R/W | 17 |
| B04 | Economy temp. Summer | Economy room temp. set point (cooling) | 27 | °C | Min. temp. set limit in cooling (Gfc02) | Max. temp. set limit in cooling (Gfc02) | | A | R/W | 98 |
| | Economy temp. Winter | Economy room temp. set point (heating) | 19 | °C | Min. temp. set limit in heating (Gfc02) | Max. temp. set limit in heating (Gfc02) | | A | R/W | 99 |
| | Economy humid. Summer | Economy room humidity set point (cooling) | 60 | % RH | 0 | 100 | | I | R/W | 18 |
| | Economy humid. Winter | Economy room humidity set point (heating) | 40 | % RH | 0 | 100 | | I | R/W | 19 |
| B11 | Regulation loop 1 (see Ha20…Ha23; Gfc36…Gfc39) | Setpoint | 0 | - | -3200 | 3200 | | A | R/W | 148 |
| | | Differential | 0 | - | -3200 | 3200 | | A | R/W | 149 |
| | | Integral time | 0 | s | 0 | 999 | | I | R/W | 129 |
| B12 | Regulation loop 2 | Setpoint | 0 | - | -3200 | 3200 | | A | R/W | 150 |
| | | Differential | 0 | - | -3200 | 3200 | | A | R/W | 151 |
| | | Integral time | 0 | s | 0 | 999 | | I | R/W | 130 |
| B13 | Regulation loop 3 | Setpoint | 0 | - | -3200 | 3200 | | A | R/W | 152 |
| | | Differential | 0 | - | -3200 | 3200 | | A | R/W | 153 |
| | | Integral time | 0 | s | 0 | 999 | | I | R/W | 131 |
| B14 | Regulation loop 4 | Setpoint | 0 | - | -3200 | 3200 | | A | R/W | 154 |
| | | Differential | 0 | - | -3200 | 3200 | | A | R/W | 155 |
| | | Integral time | 0 | s | 0 | 999 | | I | R/W | 132 |

| Mask Index | Display description | | | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C. Clock/ Scheduler | | | | | | | | | | | | |
| | Hour | | | Current time | - | hh:mm | 00:00 | 23:59 | | I | R/W | - |
| C01 | Date | | | Current date | - | dd/mm/yy | 01/01/00 | 31/12/99 | | I | R/W | - |
| | Day | | | Day of the week | - | Mo…Su | Mo | Su | | I | R | - |
| | Enable scheduler | | | Enable time bands | No | - | No | Yes | 0:No¦1:Yes | D | R/W | 85 |
| | Day | | | Day time band setting | Mo | - | Mo | Su | 0: Mo…6: Su | I | R/W | 25 |
| | Copy to | | | Day to copy settings to | Mo | - | Mo | All | 0: Mo ¦…¦ 6: Su ¦ 7: all | | D | R/W |
| | No/Yes | | | Enable copy settings | No | - | No | Yes | 0:No¦1:Yes | I | R/W | - |
| | F1 | hh | | Time band F1 start hour | | hour | 0 | 23 | | I | R/W | 26 |
| | | mm | | Time band F1 start minutes | | min. | 0 | 59 | | I | R/W | 27 |
| | | operating mode | | Time band F1 operating mode | | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy | I | R/W | 28 |
| | F2 | hh | | Time band F2 start hour | 12 | hour | 0 | 23 | - | I | R/W | 29 |
| | | mm | | Time band F2 start minutes | 30 | minute | 0 | 59 | - | I | R/W | 30 |
| C02 | | operating mode | | Time band F2 operating mode | pre-comfort | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comfort¦ 3: economy | I | R/W | 31 |
| | F3 | hh | | Time band F3 start hour | 13 | hour | 0 | 23 | - | I | R/W | 32 |
| | | mm | | Time band F3 start minutes | 30 | minute | 0 | 59 | - | I | R/W | 33 |
| | | operating mode | | Time band F3 operating mode | pre-comfort | - | 0 | 3 | 0: off 1: comfort 2: pre-comf. 3: economy | I | R/W | 34 |
| | F4 | hh | | Time band F4 start hour | 13 | hour | 0 | 23 | - | I | R/W | 35 |
| | | mm | | Time band F4 start minutes | 30 | minute | 0 | 59 | - | I | R/W | 36 |
| | | operating mode | | Time band F4 operating mode | comfort | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy | I | R/W | 37 |
| | Enable holiday period | | | Enable holidays | No | - | No | Yes | 0:No¦1:yes | D | R/W | 86 |
| | Period 1 | Start | dd | Holiday period 1 start day | - | day | 01 | 31 | - | I | R/W | 38 |
| | | | mm | Holiday period 1 start month | - | month | 01 | 12 | - | I | R/W | 39 |
| | | End | dd | Holiday period 1 end day | - | day | 01 | 31 | - | I | R/W | 40 |
| | | | mm | Holiday period 1 end month | - | month | 01 | 12 | - | I | R/W | 41 |
| | | Set | | Holiday period 1 operating mode | - | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy | I | R/W | 42 |
| | Period 2 | Start | dd | Holiday period 2 start day | - | day | 01 | 31 | - | I | R/W | 43 |
| | | | mm | Holiday period 2 start month | - | month | 01 | 12 | - | I | R/W | 44 |
| C03 | | End | dd | Holiday period 2 end day | - | day | 01 | 31 | - | I | R/W | 45 |
| | | | mm | Holiday period 2 end month | - | month | 01 | 12 | - | I | R/W | 46 |
| | | Set | | Holiday period 2 operating mode | - | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy | I | R/W | 47 |
| | Period 3 | Start | dd | Holiday period 3 start day | - | day | 01 | 31 | - | I | R/W | 48 |
| | | | mm | Holiday period 3 start month | - | month | 01 | 12 | - | I | R/W | 49 |
| | | Fine | dd | Holiday period 3 end day | - | day | 01 | 31 | - | I | R/W | 50 |
| | | | mm | Holiday period 3 end month | - | month | 01 | 12 | - | I | R/W | 51 |
| | | Set | | Holiday period 3 operating mode | - | - | 0 | 3 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy | I | R/W | 52 |
| | Enable special days | | | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | 87 |
| | SD1 | dd | | Special day 1: day | - | day | 01 | 31 | - | I | R/W | 53 |
| | | mm | | Special day 1: month | - | month | 01 | 12 | - | I | R/W | 54 |
| | | set | | Special day 1 operating mode | - | - | - | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 55 |
| | SD2 | dd | | Special day 2: day | - | day | 01 | 31 | - | I | R/W | 56 |
| | | mm | | Special day 2: month | - | month | 01 | 12 | - | I | R/W | 57 |
| C04 | | set | | Special day 2 operating mode | - | - | 0 | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 58 |
| | SD3 | dd | | Special day 3: day | - | day | 01 | 31 | - | I | R/W | 59 |
| | | mm | | Special day 3: month | - | month | 01 | 12 | - | I | R/W | 60 |
| | | set | | Special day 3 operating mode | - | - | 0 | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 61 |
| | SD4 | dd | | Special day 4: day | - | day | 01 | 31 | - | I | R/W | 62 |
| | | mm | | Special day 4: month | - | month | 01 | 12 | - | I | R/W | 63 |
| | | set | | Special day 4 operating mode | - | - | 0 | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 64 |

| Mask Index | Display description | | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C04 | SD5 | dd | Special day 5: day | - | day | 01 | 31 | - | I | R/W | 65 |
| | | mm | Special day 5: month | - | month | 01 | 12 | - | I | R/W | 66 |
| | | set | Special day 5 operating mode | - | - | 0 | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 67 |
| | SD6 | dd | Special day 6: day | - | day | 01 | 31 | - | I | R/W | 68 |
| | | mm | Special day 6: month | - | month | 01 | 12 | - | I | R/W | 69 |
| | | set | Special day 6 operating mode | - | - | 0 | 4 | 0: off ¦ 1: comfort ¦ 2: pre-comf. ¦ 3: economy ¦ 4: auto | I | R/W | 70 |
| C05 | Enable summer time | | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | 88 |
| | Transition time | | | 0 | min | 0 | 240 | | I | R/W | - |
| | Start | day | Daylight saving start day | last | - | 4 | - | 0: last ¦ 1: first ¦ 2: second ¦ 3: third ¦ 4: fourth | I | R/W | - |
| | | day of the week | Daylight saving start day of the week | Sunday | - | 1 | 7 | 1: Monday ¦…¦ 7:Sunday | I | R/W | - |
| | | month | Daylight saving start month | March | month | January | December | 1: January ¦… ¦ 12: December | I | R/W | - |
| | | hour | Daylight saving start hour | 02:00 | hour | 00:00 | 23:00 | End | I | R/W | - |
| | | day | Daylight saving end day | last | - | 4 | - | 0: last ¦ 1: first ¦ 2: second ¦ 3: third ¦ 4: fourth | I | R/W | - |
| | | day of the week | Daylight saving end day of the week | Sunday | - | 1 | 7 | 1: Monday ¦…¦ 7:Sunday | I | R/W | - |
| | | month | Daylight saving end month | March | month | January | December | 1: January ¦… ¦ 12: December | I | R/W | - |
| | | hour | Daylight saving end hour | 03:00 | hour | 00:00 | 23:00 | D. Input/Output | I | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| D. Input/Ouput | | | | | | | | | | |
| | Analog inputs | | | | | | | | | |
| D01 | --- = Supply temperature | | - | °C | -99.9 | 99.9 | | A | R | 10 |
| | --- = Return temperature | | - | °C | -99.9 | 99.9 | | A | R | 11 |
| | --- = Room temperature | | - | °C | -99.9 | 99.9 | | A | R | 12 |
| | --- = Supply humidity | | - | %rH | 0 | 100 | | I | R | 13 |
| | --- = Return humidity | | - | %rH | 0 | 100 | | I | R | 14 |
| | --- = Room humidity | | - | %rH | 0 | 100 | | I | R | 15 |
| D02 | --- = Supply pressure | | - | Pa | -9999 | 9999 | | I | R | 1 |
| | --- = Return pressure | | - | Pa | -9999 | 9999 | | I | R | 2 |
| | --- = External temperature | | - | °C | -99.9 | 99.9 | | A | R | 16 |
| | --- = External humidity | | - | %rH | 0 | 100 | | A | R | 17 |
| D03 | --- = Frost temperature | | - | °C | -99.9 | 99.9 | | A | R | 18 |
| | --- = Off-coil temperature | | - | °C | -99.9 | 99.9 | | A | R | 19 |
| | --- = Exhaust temperature | Enable: Ha01,Ha14 (defrost probe=exhaust), Hb15 | - | °C | -99.9 | 99.9 | | A | R | 20 |
| | --- = CO2 | | - | ppm | 0 | 9999 | | I | R | 3 |
| | --- = VOC | | - | % | 0 | 100 | | A | R | 21 |
| D04 | Water coil temperature | | | | | | | | | |
| | --- = Cooling- cool/heat | Enable: Hc11-Hc14; Config: Hb16 | - | °C | -99.9 | 99.9 | | A | R | 22 |
| | --- = Pre - heating | Enable: Hc09; Config: Hb17 | - | °C | -99.9 | 99.9 | | A | R | 23 |
| | --- = Re – heating | Enable: Hc16; Config: Hb18 | - | °C | -99.9 | 99.9 | | A | R | 24 |
| D05 | --- = Set offset | Enable: Ha19; Config: Hb23 | - | °C | -99.9 | 99.9 | | A | R | 25 |
| | --- = Regulation loop 1 | Enable: Ha19; Config: Hb19 | - | - | -3200 | 3200 | | A | R | 26 |
| | --- = Regulation loop 2 | Enable: Ha19; Config: Hb20 | - | - | -3200 | 3200 | | A | R | 27 |
| | --- = Regulation loop 3 | Enable: Ha19; Config: Hb21 | - | - | -3200 | 3200 | | A | R | 28 |
| | --- = Regulation loop 4 | Enable: Ha19; Config: Hb22 | - | - | -3200 | 3200 | | A | R | 29 |
| D06 | Enthalpy | | | | | | | | | |
| | Supply | Enable: Ha02 | - | kJ/kg | 0 | 999.9 | | A | R | - |
| | Return | Enable: Ha02 | - | kJ/kg | 0 | 999.9 | | A | R | - |
| | Room | Enable: Ha02 | - | kJ/kg | 0 | 999.9 | | A | R | - |
| | External | Enable: Ha02 | - | kJ/kg | 0 | 999.9 | | A | R | - |
| | Setpoint | Enable: Ha02 | - | kJ/kg | 0 | 999.9 | | A | R | - |
| | Digital inputs | | | | | | | | | |
| D07 | --- = Remote On/Off | Enable: Ha17; Config: Hb24 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 6 |
| | --- = Summer/Winter | Enable: Gc01; Config: Hb24 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 7 |
| | --- = Double setpoint | Enable: Ha18; Config: Hb24 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 8 |
| D08 | --- = Generic alarm | Config: Hb25; Delay Hc20 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 9 |
| | --- = Serious alarm | Config: Hb40 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 10 |
| | --- = Humidifier alarm | Enable: Ha01; Config: Hb28 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 11 |
| | --- = Frost-stat | Enable: Ha16; Config: Hb25 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 12 |
| D09 | --- = 1st supply filter | Config: Hb26 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 13 |
| | --- = 2nd supply filter | Config: Hb26 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 14 |
| | --- = Return filter | Enable: Ha01; Config: Hb26 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 15 |
| | --- = Supply flow | Config: Hb27 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 16 |
| | --- = Return flow | Enable: Ha01-Ha04; Config: Hb27 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 17 |
| D10 | Overload pump 1 | | | | | | | | | |
| | --- = Cooling-Cool/heat | Enable: Ha09-10; Config: Hb30 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 18 |
| | --- = Pre-heating | Enable: Ha09-11; Config: Hb30 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 19 |
| | --- = Re-heating | Enable: Ha09-12; Config: Hb30 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 20 |
| D11 | Overload pump 2 | | | | | | | | | |
| | --- = Cooling-Cool/heat | Enable: Ha09-10; Config: Hb31 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 21 |
| | --- = Pre-heating | Enable: Ha09-11; Config: Hb31 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 22 |
| | --- = Re-heating | Enable: Ha09-12; Config: Hb31 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 23 |
| D12 | Coil flow | | | | | | | | | |
| | --- = Cooling-Cool/heat | Enable: Ha09; Config: Hb32 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 24 |
| | --- = Pre-heating | Enable: Ha09;Config: Hb32 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 26 |
| | --- = Re-heating | Enable: Ha09; Config: Hb32 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 25 |
| D13 | Fans overload | | | | | | | | | |
| | --- = Supply 1 | Enable: Ha04; Config: Hb29; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 27 |
| | --- = Supply 2 | Enable: Ha03 (duty stand-by)-Ha04; Config: Hb29; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 28 |
| | --- = Return 1 | Enable: Ha01-Ha04; Config: Hb29; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 29 |
| | --- = Return 2 | Enable:Ha01-Ha03 (duty stand-by)-Ha04; Config: Hb29; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 30 |
| D14 | --- = Supply inverter alarm | Enable: Ha03; Config: Hb28 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 31 |
| | --- = Return inverter alarm | Enable: Ha01-Ha03; Config: Hb28 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 32 |
| | --- = Pre-heaters overload | Enable: Ha04-Ha05; Config: Hb33 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 33 |
| | --- = Re-heaters overload | Enable: Ha04-Ha08; Config: Hb33 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 34 |
| D15 | --- = Recovery clogged | Enable: Ha01; Config: Hb33 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 35 |
| | --- = Filter clogged | Config: Hb34 | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 36 |
| | --- = Fire & smoke | Enable: always;Config: Hb34; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 37 |
| | --- = Open switch | Enable: always;Config: Hb34; | 0 | - | 0 | 1 | 0:C:closed¦1:O:open | D | R | 38 |
| D16 | Air quality demand | Enable: Ha02; Ha15; Config: Gfc30, Hc19, Hb13, Hb14 | - | % | 0 | 100 | | | | |
| | Purging demand | Enable: Ha15;Config: Gg02; Hc19; Activate: Gg02 | 0 | - | 0 | 1 | 0:No¦ 1:Yes | D | R | - |
| | Resume time | Enable: Ha15;Config: Gg02 | 0 | min | 0 | 299 | | I | R | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Digital outputs | | | | | | | | | |
| D17 | --- = Supply fan | Config: Hb35 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 39 |
| | --- = Supply fan 2nd | Enable: Ha03 (double); Config: Hb36 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 40 |
| | --- = Return fan | Enable: Ha01; Config: Hb35 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 41 |
| | --- = Return fan 2nd | Enable: Ha01; Ha03 (double); Config: Hb36 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 42 |
| D18 | --- = Supply fan line | Enable: Ha03(Star-delta); Config: Hb37 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 43 |
| | --- = Supply fan star | Enable: Ha03; Config: Hb37 | Off | - | Off | On | 0:Off¦ 1:On | D | R | |
| | --- = Supply fan delta | Enable: Ha03; Config: Hb37 | Off | - | Off | On | 0:Off¦ 1:On | D | R | |
| | --- = Return fan line | Enable: Ha01-Ha03(Star-delta); Config: Hb38 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 44 |
| | --- = Return fan star | Enable: Ha01-Ha03; Config: Hb38 | Off | - | Off | On | 0:Off¦ 1:On | D | R | |
| | --- = Return fan delta | Enable: Ha01-Ha03; Config: Hb38 | Off | - | Off | On | 0:Off¦ 1:On | D | R | |
| D19 | --- = Unit status (On/Off) | Enable: always; Config: Hb41 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 45 |
| | --- = Humidifier | Enable: Ha01-Ha13; Config: Hb35 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 46 |
| | --- = Rotary rec./ Run around coil | Enable: Ha14; Config: Hb39 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 47 |
| | --- = Recovery heater | Enable: Ha14; Config: Hb41 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 48 |
| D20 | --- = Global alarm | Config: Hb40 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 49 |
| | --- = Serious alarm | Enable: always; Config: Hb40 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 50 |
| | --- = Minor alarm | Enable: always; Config: Hb40 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 51 |
| | --- = Filter alarm | Enable: always; Config: Hb41 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 52 |
| D21 | --- = Fresh air damper | Enable: Ha02; Config: Hb39 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 53 |
| | --- = By-pass damper | Enable: Ha14; Config: Hb39 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 54 |
| | --- = Re-heater 1 | Enable: Ha08; Config: Hb49 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 55 |
| | --- = Re-heater 2 | Enable: Ha08; Config: Hb49 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 56 |
| | --- = Re-heater 3 | Enable: Ha08; Config: Hb49 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 57 |
| | --- = Re-heater 4 | Enable: Ha08; Config: Hb49 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 58 |
| D22 | --- = Pre-heater 1 | Enable: Ha05; Config: Hb48 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 59 |
| | --- = Pre-heater 2 | Enable: Ha05; Config: Hb48 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 60 |
| | --- = Pre-heater 3 | Enable: Ha05; Config; Hb48 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 61 |
| | --- = Pre-heater 4 | Enable: Ha05; Config:Hb48 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 62 |
| D23 | --- = Cooling step 1 | Enable: Ha06 (Dir. Expans.); Config: Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 63 |
| | --- = Cooling step 2 | Enable: Ha06 (Dir. Expans.); Config: Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 64 |
| | --- = Cooling step 3 | Enable: Ha06 (Dir. Expans.); Config: Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 65 |
| | --- = Cool/ heat step 1 | Enable: Ha01-Ha07(steps);Config:Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 63 |
| | --- = Cool/ heat step 2 | Enable: Ha01-Ha07(steps);Config:Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 64 |
| | --- = Cool/ heat step 3 | Enable: Ha01-Ha07(steps);Config:Hb47 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 65 |
| | --- = Cool/ Heat | Enable: Ha01; Config: Hb42 | Off | - | Off | On | 0:Cool¦ 1:Heat | D | R | 66 |
| D24 | Pump 1 | | | | | | | | | |
| | --- = Cooling- Cool/heat | Enable: Ha01-Ha09; Config: Hb43 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 67 |
| | --- = Pre-heating | Enable: Ha01-Ha09; Config: Hb43 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 68 |
| | --- = Re-heating | Enable: Ha01-Ha09;Config: Hb43 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 69 |
| D25 | Pump 2 | | | | | | | | | |
| | --- = Cooling- Cool/heat | Enable: Ha01-Ha09; Config: Hb44 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 70 |
| | --- = Pre-heating | Enable: Ha01-Ha09; Config: Hb44 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 71 |
| | --- = Re-heating | Enable: Ha01-Ha09;Config: Hb44 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 72 |
| D26 | --- = Cooling floating valve open | Enable: Ha01-Ha06; Config: Hb45 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 73 |
| | --- = Cooling floating valve close | Enable: Ha01-Ha07; Config: Hb46 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 73 |
| | --- = Cool/heat floating valve open | Enable: Ha01-Ha06; Config: Hb45 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 74 |
| | --- = Cool/heat floating valve close | Enable: Ha01-Ha07; Config: Hb46 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 74 |
| | --- = Preheating floating valve open | Enable: Ha01-Ha05; Config: Hb45 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 75 |
| | --- = Preheating floating valve close | Enable: Ha01-Ha05; Config: Hb46 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 76 |
| | --- = Reheating floating valve open | Enable: Ha01-Ha08; Config: Hb45 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 77 |
| | --- = Reheating floating valve close | Enable: Ha01-Ha08; Config: Hb46 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 78 |
| D27 | --- = Regulation loop 1 | Enable: Ha19; Config: Hb50 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 79 |
| | --- = Regulation loop 2 | Enable: Ha19; Config: Hb50 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 80 |
| | --- = Regulation loop 3 | Enable: Ha19; Config: Hb50 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 81 |
| | --- = Regulation loop 4 | Enable: Ha19; Config: Hb50 | Off | - | Off | On | 0:Off¦ 1:On | D | R | 82 |
| D28 | Analog outputs | | | | | | | | | |
| | --- = Supply fan | Enable: Ha03 (inverter); Config: Hb51 | 0 | % | 0 | 100 | | A | R | 35 |
| | --- = Return fan | Enable: Ha01-Ha03 (inverter); Config:Hb52 | 0 | % | 0 | 100 | | A | R | 36 |
| | --- = Exhaust damper | Enable: Ha02; Config: Hb55 | 0 | % | 0 | 100 | | A | R | 37 |
| | --- = Fresh air damper | Enable: Ha02; Config: Hb53 | 0 | % | 0 | 100 | | A | R | 38 |
| | --- = Mixing damper | Enable: Ha02; Config: Hb54 | 0 | % | 0 | 100 | | A | R | 40 |
| D29 | --- = Bypass damper | Enable; Ha14; Config: Hb56 | 0 | % | 0 | 100 | | A | R | 39 |
| | --- = Rotary recovery | Enable: Ha14; Config: Hb63 | 0 | % | 0 | 100 | | A | R | 44 |
| | --- = Preheat heaters | Enable: Ha01-Ha05; Config: Hb60 | 0 | % | 0 | 100 | | A | R | 43 |
| | --- = Reheat heaters | Enable: Ha01-Ha08; Config: Hb62 | 0 | % | 0 | 100 | | A | R | 42 |
| D30 | --- = Humidifier | Enable: Ha13; Config: Hb57 | 0 | % | 0 | 100 | | A | R | 41 |
| | Valve | | | | | | | | | |
| | --- = Cooling – Cool/heat % | Enable: Ha01-Ha06; Config: Hb59 | 0 | % | 0 | 100 | | A | R | 45 |
| | --- = Preheating% | Enable: Ha05; Config: Hb58 | 0 | % | 0 | 100 | | A | R | 47 |
| | --- = Reheating % | Enable: Ha08; Config: Hb61 | 0 | % | 0 | 100 | | A | R | 46 |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| D31 | --- = Regulation loop 1 | Enable: Ha19; Config: Hb64 | 0 | % | 0 | 100 | | A | R | 48 |
| | --- = Regulation loop 2 | Enable: Ha19; Config: Hb65 | 0 | % | 0 | 100 | | A | R | 49 |
| | --- = Regulation loop 3 | Enable: Ha19; Config: Hb66 | 0 | % | 0 | 100 | | A | R | 50 |
| | --- = Regulation loop 4 | Enable: Ha19; Config: Hb67 | 0 | % | 0 | 100 | | A | R | 51 |
| D40 | Supply VFD | | | | | | | | | |
| | Status | | 0 | - | 0 | 1 | 0: not ready ¦ 1: ready | D | R | - |
| | Run | | 0 | - | 0 | 1 | 0: stop ¦ 1: run | D | R | - |
| | Direction | | 0 | - | 0 | 1 | 0: ➔ ¦1:← | D | R | - |
| | Alarms | | 0 | - | 0 | 1 | 0: No alarms ¦ 1: active | D | R | - |
| | Speed status | | 0 | - | 0 | 1 | 0: ramping ¦ 1: reference reached | D | R | - |
| D41 | Request | | 0 | - | 0 | 100 | | A | W | 53 |
| | Feedback | | 0 | - | -99.9 | 99.9 | | A | W | - |
| | Dissipator temperature | | 0 | °C | -999 | 999 | | I | R | 4 |
| | DC voltage | | 0 | V | 0 | 9999 | | I | R | 5 |
| D42 | Motor data | | | | | | | | | |
| | Speed | | 0 | - | -9999 | 9999 | | I | W | - |
| | Voltage | | 0 | V | -9999 | 9999 | | A | R | 54 |
| | Current | | 0 | A | -99.9 | 99.9 | | A | R | 55 |
| | Torque | | 0 | % | -9999 | 9999 | | A | R | 56 |
| | Power | | 0 | % | -999.9 | 999.9 | | A | R | 57 |
| D50 | Return VFD | | | | | | | | | |
| | Status | | 0 | - | 0 | 1 | 0: not ready ¦ 1: ready | D | R | - |
| | Run | | 0 | - | 0 | 1 | 0: stop ¦ 1: run | D | R | - |
| | Direction | | 0 | - | 0 | 1 | 0: ➔ ¦1:← | D | R | - |
| | Alarms | | 0 | - | 0 | 1 | 0: No alarms ¦ 1: active | D | R | - |
| | Speed status | | 0 | - | 0 | 1 | 0: ramping ¦ 1: ref. reached | D | R | - |
| D51 | Request | | 0 | - | 0 | 100 | | A | W | 59 |
| | Feedback | | 0 | - | -99 | 99 | | A | W | - |
| | Dissipator temperature | | 0 | °C | -999 | 999 | | I | R | 7 |
| | DC voltage | | 0 | V | 0 | 9999 | | I | R | 8 |
| D52 | Motor data | | | | | | | | | |
| | Speed | | 0 | - | -9999 | 9999 | | I | R | - |
| | Voltage | | 0 | V | -9999 | 9999 | | A | R | 60 |
| | Current | | 0 | A | -99.9 | 99.9 | | A | R | 61 |
| | Torque | | 0 | % | -999.9 | 999.9 | | A | R | 62 |
| | Power | | 0 | % | -999.9 | 999.9 | | A | R | 63 |
| D60 | Belimo 1…8 | Enable: Ha24-Ha27-Ha28-Ha60…83; Config: - | | | | | | | | |
| D62 D64 D66 | Request | | 0 | - | 0 | 9 | 0: Close¦ 1: Override open¦ 2: Open | A | R/W | 65;67; 69;71; 73;75; 77;79 |
| D68 D70 D72 D74 | Actual position | | 0 | % | 0 | 100 | | A | R | 66;68; 70;72; 74;76; 78;80 |
| | Actual flow | | 0 | m3/h | 0 | 100 | | A | R | - |
| D62 | External input | | | % | 0 | 100 | | I | R | - |
| D64 | | | 0 | - | 0 | 1 | 0: Open¦ 1: Close | D | R | - |
| D66 D68 D70 D72 D74 | Net alarm | | 0 | - | 0 | - | 0: no alarm ¦ 1: offline ¦ 2: unknown command ¦ 3: unpermitted command ¦ 4: device error | I | R | - |
| D61 | Belimo 1…8 information | | | | | | | | | |
| D63 | SW version | | 0 | - | - | - | | I | R | - |
| D65 D67 D69 D71 D73 D75 | Serial number | | 0 | - | - | - | - | I | R | - |
| D81 | Serial probe n°1…6 | Enable: Ha26; Config: Ha31-Ha91 | 0 | - | 0 | 99 | | I | W | - |
| D82 | Temperature | | 0 | °C | - | - | | A | W | - |
| D83 | Humidity | | 0 | % RH | - | - | | A | W | - |
| D84 | Dew point | | 0 | °C | - | - | | A | W | - |

E. Data logger

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| E01 | Alarm Nr.-hour-date Code – Description Supply temperature – Return temperature | Pressing the bell button displays the alarm log. For the complete list see chap. Alarms | 0 | - | 0 | 99 | | I | R/W | - |

F. Board switch: see chapter "Description of the Menus"

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| G. Service | | | | | | | | | | |
| a. | Change language | | | | | | | | | |
| Ga01 | ENTER to change/ ESC to confirm | | 0 | - | 0 | 9 | 0:Italian ¦1: English ¦2:Spanish | I | R/W | - |
| Ga02 | Disable language mask at startup | | No | - | No | Yes | 0:No¦ 1:Yes | D | R/W | - |
| | Display countdown | | 60 | s | 0 | 999 | | I | R | - |
| b. | Information | | | | | | | | | |
| Gb01 | Software code – Version - date Manual: Bios: …; Date …; Boot: …; Date …; | | 0 | - | 0 | 99 | | I | R | - |
| Gb02 | pCO type | | 0 | - | 1 | 10 | 0: pCO2¦ 1: pCO1 ¦ 2: pCO2¦ 3: pCOC¦ ¦ 4: pCOXS¦ 5: pCOOEM¦ ¦ 6: -¦ 7: PCO3 8: Snode¦9: -¦ ¦ 10: pCO5¦ | I | R/W | - |
| | Type of pCO controller | | 0 | - | 0 | 99 | 10: Large¦ 11: Medium ¦ 12: Small ¦ 13: XL N.O. ¦ 17: XL N.C. | I | R/W | - |
| | Total flash | | 0 | - | 0 | 9999 | | I | R/W | - |
| | Ram | | 0 | - | 0 | 9999 | | I | R/W | - |
| | Built-in type | | 0 | - | 0 | 9 | 0: No ¦ 2: pGD0 ¦ 3: pGD1 | I | R | - |
| | Main cycle | | 0 | - | 0 | 9999 | | A | W | - |
| | Cycle/s | | 0 | - | 0 | 9999 | | I | R | - |
| c. | Summer/winter | | | | | | | | | |
| Gc01 | Season selection from | | 0 | - | 0 | 5 | 0:Keyboard ¦1: Digital input ¦ 2:B.M.S. ¦ 3:Keyboard/ B.M.S. ¦4:Auto ¦5: H2O temperature | I | R | - |
| Gc02 | Set season | | 0 | - | 0 | 1 | 0:Auto¦1:Fix days | D | R/W | 174 |
| | Summer start | | 15/05 | dd/mm | 01/01 | 31/12 | | I | R/W | 134-5 |
| | Winter start | | 30/09 | dd/mm | 01/01 | 31/12 | | I | R/W | 136-7 |
| | Threshold summer | | 25 | °C | -99.9 | 99.9 | | A | R/W | 156 |
| | Threshold winter | | 10 | °C | -99.9 | 99.9 | | A | R/W | 157 |
| | Delay change | | 1 | hour | 0 | 999 | | I | R/W | 138 |
| Gc03 | Season threshold | Enable: Gc01=temp.H2O, Hc14, Hb16 | | | | | | | | |
| | Summer | | 25 | °C | -99.9 | 99.9 | | A | R/W | |
| | Winter | | 30 | °C | -99.9 | 99.9 | | A | R/W | |
| d. | Working hours | | | | | | | | | |
| Working hours | | | | | | | | | | |
| Gd01 | Supply fan | | 0 | hour | 0 | 999 | | I | R | 146-7 * |
| | Return fan | | 0 | hour | 0 | 999 | | I | R | 150-1 * |
| | Humidifier | | 0 | hour | 0 | 999 | | I | R | 154-5 * |
| | Rotary recovery | | 0 | hour | 0 | 999 | | I | R | 156-7 * |
| Gd02 | Cool pump 1 | | 0 | hour | 0 | 999 | | I | R | 158-9 * |
| | Cool pump 2 | | 0 | hour | 0 | 999 | | I | R | 160-1 * |
| | Preheat pump 1 | | 0 | hour | 0 | 999 | | I | R | 162-3 * |
| | Preheat pump 2 | | 0 | hour | 0 | 999 | | I | R | 164-5 * |
| | Reheat pump 1 | | 0 | hour | 0 | 999 | | I | R | 166-7 * |
| | Reheat pump 2 | | 0 | hour | 0 | 999 | | I | R | 168-9 * |
| Gd03 | Preheating heaters | | | | | | | | | |
| | Heater 1 | | 0 | hour | 0 | 999 | | I | R | 170*-1 |
| | Heater 2 | | 0 | hour | 0 | 999 | | I | R | 172*-3 |
| | Heater 3 | | 0 | hour | 0 | 999 | | I | R | 174*-5 |
| | Heater 4 | | 0 | hour | 0 | 999 | | I | R | 176*-7 |
| Gd04 | Reheating heaters | | | | | | | | | |
| | Heater 1 | | 0 | hour | 0 | 999 | | I | R | 178*-9 |
| | Heater 2 | | 0 | hour | 0 | 999 | | I | R | 180*-1 |
| | Heater 3 | | 0 | hour | 0 | 999 | | I | R | 182*-3 |
| | Heater 4 | | 0 | hour | 0 | 999 | | I | R | 184*-5 |
| e. | BMS Configuration | * =Working hours X 1000 | | | | | | | | |
| Ge01 | BMS protocol | | 0 | - | 0 | 2 | 0:CAREL¦1:MODBUS¦ 2:LON¦ | I | R/W | - |
| | Baud rate | | 0 | bps | 0 | 4 | 0:1200 ¦1:2400 ¦ 2:4800 ¦3:9600 ¦ 4:19200 | I | R/W | - |
| | Address | | 1 | - | 0 | 207 | | I | R/W | - |
| Ge02 | BMS offline alarm enable | | 0 | - | 0 | 1 | 0:No¦1:Yes | I | R/W | - |
| | Timeout | | 0 | s | 0 | 900 | - | I | R | - |
| Ge03 | Press ENTER to ENABLE commissioning service /Connect the BMS port | | 0 | - | 0 | 1 | 0:No¦1:Yes | D | R | - |
| f. | Service settings | | | | | | | | | |

| a. | Working hour set | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Supply fan | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| Gfa01 | Reset (acts on counter Gd01) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Return fan | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd01) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Humidifier | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| Gfa02 | Reset (acts on counter Gd01) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Rotary recovery | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd01) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Pumps 1/2 | | | | | | | | | |
| | Cooling | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd02) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| Gfa03/4 | Preheating | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd02) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Reheating | | | | | | | | | |
| | Threshold | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd02) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Preheating heaters | | | | | | | | | |
| | Threshold heater 1 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| Gfa05 | Reset (acts on counter Gd03) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Threshold heater 2 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd03) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Threshold heater 3 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| Gfa05 | Reset (acts on counter Gd03) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Reset (acts on counter Gd03) | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd03) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Reheating heaters | | | | | | | | | |
| | Threshold heater 1 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd04) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Threshold heater 2 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| Gfa06 | Reset (acts on counter Gd04) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Threshold heater 3 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd04) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |
| | Threshold heater 4 | | 0 | hour | 0 | 99000 | | I | R/W | - |
| | Reset (acts on counter Gd04) | | 0 | - | 0 | 1 | 0:N=No ¦ 1:Y=Yes | D | R/W | - |

| b. | Probe adjustment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Supply temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | - | °C | -99.9 | 99.9 | | A | R | 10 |
| | Return temperature | | | | | | | | | |
| Gfb01 | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | - | °C | -99.9 | 99.9 | | A | R | 11 |
| | Return temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | - | °C | -99.9 | 99.9 | | A | R | 16 |
| | Supply humidity | | | | | | | | | |
| | Offset | | 0 | % RH | -20 | 20 | | I | R/W | - |
| | Probe | | 0 | % RH | 0 | 100 | | A | R | 13 |
| | Return humidity | | | | | | | | | |
| Gfb02 | Offset | | 0 | % RH | -20 | 20 | | I | R/W | - |
| | Probe | | 0 | % RH | 0 | 100 | | A | R | 14 |
| | External humidity | | | | | | | | | |
| | Offset | | 0 | % RH | -20 | 20 | | I | R/W | - |
| | Probe | | 0 | % RH | 0 | 100 | | I | R | 17 |
| | Supply pressure | | | | | | | | | |
| | Offset | | 0 | Pa | -200 | 200 | | I | R/W | - |
| Gfb03 | Probe | | 0 | Pa | -9999 | 9999 | | I | R | 1 |
| | Return pressure | | | | | | | | | |
| | Offset | | 0 | Pa | -200 | 200 | | I | R/W | - |
| | Probe | | 0 | Pa | -9999 | 9999 | | I | R | 2 |
| | CO2 air quality | | | | | | | | | |
| | Offset | | 0 | ppm | -99 | 99 | | I | R/W | - |
| Gfb04 | Probe | | 0 | ppm | 0 | 9999 | | I | R | 3 |
| | VOC air quality | | | | | | | | | |
| | Offset | | 0 | % | -50 | 50 | | I | R/W | - |
| | Probe | | 0 | % | 0 | 999 | | A | R | - |
| | Frost temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 18 |
| | Off-coil temperature | | | | | | | | | |
| Gfb05 | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 19 |
| | Exhaust temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | I | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 20 |
| | Cool water temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 22 |
| | Preheat water temperature | | | | | | | | | |
| Gfb06 | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 23 |
| | Reheat water temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | A | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 24 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gfb07 | Room temperature | | | | | | | | | |
| | Offset | | 0 | °C | -9.9 | 9.9 | | I | R/W | - |
| | Probe | | 0 | °C | -99.9 | 99.9 | | A | R | 12 |
| | Room humidity | | | | | | | | | |
| | Offset | | 0 | % RH | -99.9 | 99.9 | | A | R/W | - |
| | Probe | | 0 | % RH | 0 | 100 | | A | R | - |
| Gfb08 | Regulation loop probes 1/2/3/4 | | | | | | | | | |
| | Offset | | 0 | | -20 | 20 | | A | R/W | - |
| | Probe | | 0 | | -3200 | 3200 | | I | R | 26;27; 28;29 |
| Gfb09 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -99.9 | 99.9 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0:<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb10 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0:<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb11 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0:<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb12 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0:<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb13 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb14 | Serial probe n° | | 0 | --- | 0 | 99 | | I | W | |
| | Temperature | | | | | | | | | |
| | Adj: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb: °C | | 0.0 | --- | -30.0 | 70.0 | | A | W | |
| | | | 0 | --- | 0 | 1 | 0:<br>1: Humidity | D | R/W | |
| | Adj: | | 0.0 | --- | -10.0 | 10.00 | | A | R/W | |
| | Prb: % | | 0.0 | --- | 0.0 | 99.9 | | A | W | |
| Gfb15 | pCOe number: | | 1 | --- | 0 | 999 | | I | W | |
| | Ch 1: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | -99.9 | 99.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| | Ch 2: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | -99.9 | 99.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| Gfb16 | pCOe number: | | 1 | --- | 0 | 999 | | I | W | |
| | Ch 3: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| | Ch 4: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | 99.9 | 999.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| Gfb17 | pCOe number: | | 1 | --- | 0 | 999 | | I | W | |
| | Ch 1: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| | Ch 2: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | 99.9 | 999.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| Gfb18 | pCOe number: | | 1 | --- | 0 | 999 | | I | W | |
| | Ch 3: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | -10.0 | 10.0 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |
| | Ch 4: | | | | | | | | | |
| | Ofs.: | | 0.0 | --- | 99.9 | 999.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | 0.0 | 10.0 | | I | R/W | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gfb19 | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| Gfb20 | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| Gfb21 | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| Gfb22 | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| | Belimo | | 0 | --- | 1 | 8 | | I | W | |
| | Ofs.: | | 0.0 | --- | -9.9 | 9.9 | | A | R/W | |
| | Prb.: | | 0.0 | --- | -99.9 | 99.9 | | A | R | |
| c. | Thermoregulation | | | | | | | | | |
| | Main mask information | | | | | | | | | |
| Gfc01 | 1st row | | Return tempe-rature | - | 0 | 14 | 0:None 1:Supply temp.¦ 2:Return temp.¦ 3:Room temp.¦ 4:External temp¦ 5:Temp setpoint¦ 6: Supply humid.¦ 7: Return humid.¦8:Room humid.¦ 9:Ext. humid.¦ 10: Humid. setpoint¦ 11:Supply pressure.¦ 12:Return pressure¦ 13: CO2 quality¦ 14: VOC quality | I | R/W | - |
| | 2nd row | | Return hum. | - | 0 | 14 | See 1st row | I | R/W | |
| | Temperature set limits | | | | | | | | | |
| Gfc02 | Summer low | | 15 | °C | -99.9 | 99.9 | | A | R/W | 106 |
| | Summer high | | 35 | °C | Summer low | 99.9 | | A | R/W | 107 |
| | Winter low | | 15 | °C | -99.9 | 99.9 | | A | R/W | 108 |
| | Winter high | | 35 | °C | Winter low | 99.9 | | A | R/W | 109 |
| | Humidity set limits | | | | | | | | | |
| Gfc03 | Summer low | | 30 | % RH | 0 | 100 | | I | R/W | 71 |
| | Summer high | | 90 | % RH | Summer low | 100 | | I | R/W | 72 |
| | Winter low | | 30 | % RH | 0 | 100 | | I | R/W | 73 |
| | Winter high | | 90 | % RH | Winter low | 100 | | I | R/W | 74 |
| | Temperature regulation | | | | | | | | | |
| Gfc04 | Regulation type | | Prop+ integr | | | | 0:Proportional¦ 1:Prop.+Integr.¦2:PID | I | R/W | 75 |
| | Auto cool/heat | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | 168 |
| | Supply limits | | None | - | 1 | 4 | 1:None ¦2:High ¦3:Low ¦4:High/Low | I | R/W | 76 |
| | Cooling regulation | | | | | | | | | |
| Gfc05 | Differential | | 2 | °C | 0 | 99.9 | | A | R/W | 110 |
| | Neutral zone | | 1 | °C | 0 | 99 | | A | R/W | 111 |
| | Integral time | | 300 | s | 0 | 999 | | I | R/W | 77 |
| | Derivative time | | 0 | s | 0 | 999 | | I | R/W | 78 |
| | Heating regulation | | | | | | | | | |
| Gfc06 | Differential | | 2 | °C | 0 | 99.9 | | A | R/W | 112 |
| | Neutral zone | | 1 | °C | 0 | 99 | | A | R/W | 113 |
| | Integral time | | 300 | s | 0 | 999 | | I | R/W | 79 |
| | Derivative time | | 0 | s | 0 | 999 | | I | R/W | 80 |
| | Temperature supply limits | | | | | | | | | |
| Gfc07 | Summer high | | 40 | °C | -99.9 | 99.9 | | A | R/W | 116 |
| | Winter high | | 40 | °C | -99.9 | 99.9 | | A | R/W | 117 |
| | Summer low | | 10 | °C | -99.9 | 99.9 | | A | R/W | 114 |
| | Winter low | | 10 | °C | -99.9 | 99.9 | | A | R/W | 115 |
| | Differential | | 3 | °C | 0 | 99.9 | | A | R/W | 118 |
| | Integral time | | 150 | s | 0 | 999 | | I | R/W | 81 |
| | Enable double action | Enable: Gfc04: Auto cool/heat: yes Supply limits: alto/basso | No | - | No | Yes | 0:No¦1:Yes | D | R/W | 169 |
| Gfc08 | Type of summer setpoint com-pensation | | None | - | - | - | 0:None ¦ 1:External ¦ 2:Room ¦ 3:Return | I | R/W | 82 |
| | Compensation delta | | 2 | °C | -99.9 | 99.9 | | A | R/W | 121 |
| | Compensation start | | 25 | °C | -99.9 | 99.9 | | A | R/W | 119 |
| | Compensation end | | 32 | °C | -99.9 | 99.9 | | A | R/W | 120 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gfc09 | Type of winter setpoint compensation | | None | - | - | - | 0:None ¦ 1:External ¦ 2:Room ¦ 3:Return | I | R/W | 83 |
| | Compensation delta | | -2 | °C | -99.9 | 99.9 | | A | R/W | 124 |
| | Compensation start | | 0 | °C | -99.9 | 99.9 | | A | R/W | 122 |
| | Compensation end | | -8 | °C | -99.9 | 99.9 | | A | R/W | 123 |
| Gfc10 | Humidity regulation | | | | | | | | | |
| | Regulation type | | Proport | | | | 0:Proportional ¦1:Proportional +Integral ¦2:PID | I | R/W | 84 |
| | Auto hum/dehum | | No | - | No | Yes | 0:No ¦ 1:Yes | D | R/W | 170 |
| | Supply limits | | | | | | 1: none ¦ 2: high ¦ 3: low ¦ 4: high/low | I | R/W | 85 |
| Gfc11 | Dehumidification regulation | | | | | | | | | |
| | Differential | | 5 | % RH | 0 | 100 | | I | R/W | 86 |
| | Neutral zone | | 2 | % RH | 0 | 100 | | I | R/W | 87 |
| | Integral time | | 300 | s | 0 | 999 | | I | R/W | 88 |
| | Derivative time | | 0 | s | 0 | 99 | | I | R/W | 89 |
| Gfc12 | Humidification regulation | | | | | | | | | |
| | Differential | | 4 | % RH | 0 | 100 | | I | R/W | 90 |
| | Neutral zone | | 2 | % RH | 0 | 100 | | I | R/W | 91 |
| | Integral time | | 300 | s | 0 | 999 | | I | R/W | 92 |
| | Derivative time | | 0 | s | 0 | 99 | | I | R/W | 93 |
| Gfc13 | Humidity supply limits | Enable: Hc01 (Humidity probe ≠ supply) | | | | | | | | |
| | High limit | | 100 | % RH | 0 | 100 | | I | R/W | 95 |
| | Low limit | | 0 | % RH | 0 | 100 | | I | R/W | 94 |
| | Differential | | 4 | % RH | 0 | 100 | | I | R/W | 96 |
| | Integral time | | 150 | s | 0 | 999 | | I | R/W | 97 |
| Gfc14 | Priority | - | 0 | - | 0 | 1 | 0: Temp.¦ 1: Humidity | D | R/W | 171 |
| Gfc15 | Freecooling/Freeheating dampers settings | | | | | | | | | |
| | Temperature differential | | 4 | °C | 0 | 99.9 | | A | R/W | 125 |
| | Enthalpy differential | | 5 | kJ/kg | 0 | 99.9 | | A | R/W | 126 |
| Gfc16 | Enthalpy management | | | | | | | | | |
| | Atmospheric pressure | | 1090 | mbar | 600 | 1100 | | I | R/W | 98 |
| Gfc17 | Supply inverter | | | | | | | | | |
| | Min/ fixed power | | 30 | % | 0 | Max | | A | R/W | 127 |
| | Max power | | 100 | % | Min | 100 | | A | R/W | 128 |
| | Return inverter | | | | | | | | | |
| | Min/ fixed power | | 30 | % | 0 | Max | | A | R/W | 129 |
| | Max power | | 100 | % | Min | 100 | | A | R/W | 130 |
| Gfc18 | Supply flow control | | | | | | | | | |
| | Setpoint | | 1500 | Pa | 0 | 2000 | | I | R/W | 99 |
| | Differential | | 300 | Pa | 0 | 1000 | | I | R/W | 100 |
| | Integral time | | 300 | s | 0 | 9999 | | I | R/W | 101 |
| | Derivative time | | 10 | s | 0 | 9999 | | I | R/W | 102 |
| Gfc19 | Return flow control | | | | | | | | | |
| | Setpoint | | 1500 | Pa | 0 | 2000 | | I | R/W | 103 |
| | Differential | | 300 | Pa | 0 | 1000 | | I | R/W | 104 |
| | Integral time | | 300 | s | 0 | 9999 | | I | R/W | 105 |
| | Derivative time | | 10 | s | 0 | 9999 | | I | R/W | 106 |
| Gfc20 | Cooling cascade | | | | | | | | | |
| | Freecooling | | 50 | % | 0 | 100 | | I | R/W | 107 |
| | Coil | | 50 | % | 0 | 100 | | I | R/W | 108 |
| | Recovery | | 40 | % | 0 | 100 | | I | R/W | 109 |
| | Coil | | 40 | % | 0 | 100 | | I | R/W | 110 |
| Gfc21 | Heating cascade | | | | | | | | | |
| | Freeheating | | 50 | % | 0 | 100 | | I | R/W | 111 |
| | Coil | | 50 | % | 0 | 100 | | I | R/W | 112 |
| | Recovery | | 40 | % | 0 | 100 | | I | R/W | 114 |
| | Coil | | 40 | % | 0 | 100 | | I | R/W | 115 |
| Gfc22 | Heating cascade | Enable: Ha08: Reheating operation = supplement | | | | | | | | |
| | Reheating | | 80 | % | 0 | 100 | | I | R/W | 116 |
| Gfc23 | Minimum cooling valve opening | | | | | | | | | |
| | Cooling | | 0 | % | 0 | 100 | | I | R/W | 117 |
| | Dehumidification | | 0 | % | 0 | 100 | | I | R/W | 118 |
| | Unit off | | 0 | % | 0 | 100 | | I | R | - |
| | Only antiblock | | No | - | No | Yes | 0:No¦1:Yes | D | R | - |
| Gfc24 | Minimum preheating valve opening | | 0 | % | 0 | 100 | | I | R/W | 119 |
| | Unit off | | 0 | % | 0 | 100 | | I | R | - |
| | Only antiblock | | No | - | No | Yes | 0:No¦1:Yes | D | R | - |
| Gfc25 | Preheating coil settings when humidifying | | | | | | | | | |
| | Setpoint | | 23 | °C | -99.9 | 99.9 | | A | R/W | 131 |
| | Differential | | 2 | °C | 0 | 99.9 | | A | R/W | 132 |
| Gfc26 | Minimum heat/cool valve opening | | | | | | | | | |
| | Cooling | | 0 | % | 0 | 100 | | I | R/W | 121 |
| | Dehumidification | | 0 | % | 0 | 100 | | I | R/W | 122 |
| | Heating | | 0 | % | 0 | 100 | | I | R/W | 123 |
| | Unit off | | 0 | % | 0 | 100 | | I | R | - |
| | Only antiblock | | No | - | No | Yes | 0:No¦1:Yes | D | R | - |
| Gfc27 | Preheating coil settings when humidifying | | | | | | | | | |
| | Setpoint | | 20 | °C | -99.9 | 99.9 | | A | R/W | 133 |
| | Differential | | 2 | °C | 0 | 99.9 | | A | R/W | 134 |
| Gfc28 | Reheating coil compensation setting | | | | | | | | | |
| | Setpoint | | 24 | °C | -99.9 | 99.9 | | A | R/W | 135 |
| | Differential | | 3 | °C | 0 | 99.9 | | A | R/W | 136 |
| Gfc29 | Minimum reheat valve opening | | 0 | % | 0 | 100 | | I | R/W | 120 |
| | Unit off | | 0 | % | 0 | 100 | | I | R | - |
| | Only antiblock | | No | - | No | Yes | 0:No¦1:Yes | D | R | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gfc30 | Air quality with CO2 | | | | | | | | | |
| | Setpoint | | 1200 | ppm | 0 | 5000 | | I | R/W | 124 |
| | Differential | | 200 | ppm | 0 | 5000 | | I | R/W | 126 |
| | Air quality with VOC | | | | | | | | | |
| | Setpoint | | 50 | % | 0 | 100 | | I | R/W | 125 |
| | Differential | | 10 | % | 0 | 100 | | I | R/W | 127 |
| Gfc31 | Heat recovery temperature activation | | | | | | | | | |
| | Delta recovery | | 5 | °C | 0 | 99.9 | | A | R/W | 137 |
| | Differential recovery | | 3 | °C | 0 | 99.9 | | A | R/W | 138 |
| | Enthalpy regulation | | | | | | | | | |
| | Differential | | 5 | kJ/kg | 0 | 99.9 | | A | R/W | 139 |
| Gfc32 | Heat recovery defrost | | | | | | | | | |
| | Setpoint | | -1 | °C | -99.9 | 10 | | A | R/W | 140 |
| | Differential | | 4 | °C | 0 | 99.9 | | A | R/W | 141 |
| | Heater offset | | 3 | °C | 0 | 99.9 | | A | R/W | 142 |
| | Wheel min speed | | 100 | % | 0 | 100 | | I | R/W | 128 |
| Gfc33 | Frost settings | | | | | | | | | |
| | Setpoint | | 5 | °C | -99.9 | 99.9 | | A | R/W | 143 |
| | Differential | | 3 | °C | 0 | 99.9 | | A | R/W | 144 |
| Gfc34 | Room frost protection enable | | 0 | - | 0 | 1 | 0: No¦1: Yes | D | R/W | 172 |
| | Threshold | | 5 | °C | -99.9 | 99.9 | | A | R/W | 145 |
| Gfc35 | Adiabatic humidifier - Supply low temperature limit | | | | | | | | | |
| | Enable limit | | No | - | No | Yes | 0: No¦1: Yes | D | R/W | 173 |
| | Setpoint | | 15 | °C | 0 | 99.9 | | A | R/W | 146 |
| | Differential | | 2 | °C | 0 | 99.9 | | A | R/W | 147 |
| Gfc36 | Regulation loop 1 | | | | | | | | | |
| | Setpoint | | 0 | - | -3200 | 3200 | | A | R/W | 148 |
| | Differential | | 0 | - | -3200 | 3200 | | A | R/W | 149 |
| | Integral time | | 0 | s | 0 | 999 | | I | R/W | 129 |
| Gfc37 | Regulation loop 2 | | | | | | | | | |
| | Setpoint | | 0 | - | -3200 | 3200 | | A | R/W | 150 |
| | Differential | | 0 | - | -3200 | 3200 | | A | R/W | 151 |
| | Integral time | | 0 | s | 0 | 999 | | I | R/W | 130 |
| Gfc38 | Regulation loop 3 | | | | | | | | | |
| | Setpoint | | 0 | - | -3200 | 3200 | | A | R/W | 152 |
| | Differential | | 0 | - | -3200 | 3200 | | A | R/W | 153 |
| | Integral time | | 0 | s | 0 | 999 | | I | R/W | 131 |
| Gfc39 | Regulation loop 4 | | | | | | | | | |
| | Setpoint | | 0 | - | -3200 | 3200 | | A | R/W | 154 |
| | Differential | | 0 | - | -3200 | 3200 | | A | R/W | 155 |
| | Integral time | | 0 | s | 0 | 999 | | I | R/W | 132 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| d. | User device /Change PW1 | | | | | | | | | |
| Gfd01 | Load configuration | | No | - | No | Yes | 0: No¦ 1: Yes | D | R/W | - |
| | Last saving | | --/--/-- | dd/mm/yy | 00/00/00 | 99/99/99 | | D | R/W | - |
| Gfd02 | Delete data logger | | No | - | No | Yes | 0: No¦ 1: Yes | D | R/W | - |
| Gfd03 | Insert new service password (PW1) | | 1234 | ---- | 0000 | 9999 | - | I | R | |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| g. | Manual management | | | | | | | | | |
| Gg01 | Supply fan | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 139 |
| | Return fan | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 140 |
| | Cooling -Cool/heat coil | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 141 |
| | Preheating coil | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 142 |
| | Reheating coil | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 143 |
| | Humidifier | | Auto | % | 0 | 101 | 0:Auto¦ 1:0%; ¦101=100% | I | R/W | 145 |
| Gg02 | Air quality | | | | | | | | | |
| | Start purging | | No | - | No | Yes | 0: No ¦ 1: Yes | D | R/W | 175 |
| | Stop purging | | No | - | No | Yes | 0: No ¦ 1: Yes | D | R/W | 176 |
| | >> Cleaning active << | | 0 | - | 0 | 1 | 0: No ¦ 1: Yes | D | R | - |
| | Purging time | | | | | | | | | |
| | Resume time | | 0 | min | 0 | 999 | | I | W | - |
| | Repeat at start-up | | No | - | No | Yes | 0: No ¦ 1: Yes | D | R | - |
| Gg40 | Supply VFD | | | | | | | | | |
| | Reset alarms | | No | - | No | Yes | 0: No ¦ 1: Yes | D | R/W | 177 |
| Gg50 | Return VFD | | | | | | | | | |
| | Reset alarms | | No | - | No | Yes | 0: No ¦ 1: Yes | D | R/W | 178 |
| Gg60 | Belimo1…Belimo8 | | | | | | | | | |
| Gc61 | Start adaptation | | No | - | No | Yes | | D | R/W | |
| Gc62 | Start testrun | | No | - | No | Yes | | D | R/W | |
| Gc63 | Adapted angle | | Yes | - | No | Yes | | D | R/W | |
| Gc64<br>Gc65<br>Gc66<br>Gc67 | Alarms reset | | No | | No | Yes | | D | R/W | |

| Mask Index | Display description | Description/ notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| H. Manufacturer | | | | | | | | | | |
| a. | Configuration | | | | | | | | | |
| | Main device enable | | | | | | | | | |
| | Fans | | Supply-Return | - | Supply | Supply-return | 0: Supply¦1: Supply-Return | D | R/W | - |
| Ha01 | Coil | | Cool+ Preheat+ Reheat | | | | 0: None ¦1:Cool+ Preheat+ Reheat¦ 2: Cooling ¦ 3: Heating ¦ 4: Cooling+ Preheating ¦ 5: Cooling+Reheating 6: Cool/Heat coil ¦ 7: Cool/Heat coil +Reheat | I | R/W | - |
| | Humidifier | | Enabled | - | Disabled | Enabled | 0: Disabled ¦1: Enabled | D | R/W | - |
| | Recovery | | Enabled | - | Disabled | Enabled | 0: Disabled ¦1: Enabled | D | R/W | - |
| Ha02 | Dampers type | | Fresh air+ mixing | | | | 1: Fresh air (On/Off) ¦ 2: fresh air (Mod) ¦ 3: Fresh air+Mixing ¦ 4:Fresh air +Mix+Exhaust ¦ 5: Fresh air(Mod) +Exhaust | I | R/W | - |
| | Freecooling | | Temp. | - | 1 | 3 | 1: None ¦ 2: Temperature ¦ 3: Enthalpy | I | R/W | - |
| | Freeheating | | Temp. | - | 1 | 3 | 1: None ¦ 2: Temperature ¦ 3: Enthalpy | I | R/W | - |
| | Enable air quality managem. | | Yes | - | 0 | 1 | 0: No ¦ 1: Yes | D | R/W | - |
| Ha03 | Fan type | | Inverter | - | 1 | 6 | 1: On-Off (Direct start) ¦ 2: On-Off (Star-delta) ¦ 3: On-Off (Double.) 4: Inverter ¦ 5: On-Off (2 speed) ¦ 6: On-Off (Duty stand-by) | I | R/W | - |
| | Fan Regulation | | Static press. | - | 1 | 6 | 1: Static pressure ¦ 2: Air quality ¦ 3: Fixed speed | I | R/W | - |
| | Fan alarms | | | | | | | | | |
| Ha04 | Overload | | Supply +return | - | 1 | 3 | 1: None ¦ 2: Supply ¦ 3: Supply+return | I | R/W | - |
| | Air flow | | Supply +return | - | 0 | 3 | 1: None ¦ 2: Supply ¦ 3: Supply+return | I | R/W | - |
| | Air flow from | | Pressure switch | - | 0 | 1 | 0: Pressure switch ¦ 1: Transducer | D | R/W | - |
| | Stop action | | Indiv. | - | 0 | 1 | 0: Individual ¦1: All | D | R/W | - |
| | Preheating output | | Modulating valve | | 1 | 3 | 1: Modulating valve ¦ 2: Floating valve ¦ 3: Heaters | I | R/W | - |
| | Heaters number | | 0 | - | 1 | 4 | | I | R/W | - |
| Ha05 | Heaters type | | On/Off | - | | | 1: On/Off ¦ 2: Modulating ¦ 3: On/Off binary (2 heaters) | I | R/W | - |
| | Temperature probe when humidifying | | Off coil | - | | | 0: Off coil ¦ 1: Regulation | D | R/W | - |
| | Cooling output type | | Modulating valve | - | 1 | 3 | 1: Modulating valve ¦ 2: Floating valve ¦ 3: Direct expansion | I | R/W | - |
| Ha06 | Cooling steps (direct expans.) | | 1 | - | 1 | 3 | | I | R/W | - |
| | Dehumidification | | On regulation probe | - | 1 | 3 | 1: On regulation probe 2: On dew point 3: Disabled | I | R/W | - |
| | Heat cool output | Enable: Ha01 | Modulating valve | - | 1 | 3 | 1: Modulating valve ¦ 2: Floating valve 3: Steps ¦ | I | R/W | - |
| Ha07 | Dehumidification | | On regulation probe | - | 1 | 3 | 1: On regulation probe ¦ 2: On dew point ¦ 3: Disabled | I | R/W | - |
| | Temperature probe when humidifying | | Off-coil | - | 0 | 1 | 0: Off-coil 1: Regulation | D | R/W | - |
| | Reheating output | | Heaters | - | 1 | 3 | 1: Modulating valve ¦ 2: Floating valve ¦ 3: Heaters | I | R/W | - |
| | Heaters number | | 3 | - | 1 | 4 | | I | R/W | - |
| Ha08 | Heaters type | | On/Off | - | 1 | 3 | 1: On/Off ¦ 2: Modulating ¦ 3: On/Off binary (2 heaters) | I | R/W | - |
| | Reheating working mode | | Compensation | - | 1 | 3 | 1: Integration ¦ 2: Compensation ¦ 3: Compensation +Integrat. | I | R/W | - |
| Ha09 | Enable water pumps Cooling-Cool/heat | Cool/heat | | | | | | | | |
| | No | | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - | |
| | Preheating | | No | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Reheating | | No | | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Enable flow feedback | | No | | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Cooling – cool/ heat pumps | | | | | | | | | |
| Ha10 | Number of pumps | | 2 | - | 1 | 2 | | I | R/W | - |
| | Warning limit | | 3 | - | 0 | 5 | | I | R/W | - |
| | Enable antiblock | | Yes | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Preheating pumps | | | | | | | | | |
| Ha11 | Number of pumps | | 2 | - | 1 | 2 | | I | R/W | - |
| | Warning limit | | 3 | - | 0 | 5 | | I | R/W | - |
| | Enable antiblock | | Yes | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |

| Mask Index | Display description | Description/ notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Reheating pumps | | | | | | | | | |
| Ha12 | Number of pumps | | 2 | - | 1 | 2 | | I | R/W | - |
| | Warning limit | | 3 | - | 0 | 5 | | I | R/W | - |
| | Enable antiblock | | Yes | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| Ha13 | Humidifier | | | | | | | | | |
| | Type | | Adiab.(mod. control) | - | 1 | 4 | 1: Isothermic (On/Off control)¦2: Isothermic (Modulating control) ¦ 3:Adiabatic (On/Off control)¦ 4: Adiabatic ( Modulating control) | I | R/W | - |
| Ha14 | Heat recovery type | | Plate exch. | - | 1 | 5 | 1: None ¦ 2: Plate exchanger¦ 3: Run around coil ¦ 4: Modulating rotary exchanger¦ 5: On/Off rotary exchanger | I | R/W | - |
| | Regulation | | Temp. | - | 0 | 1 | 0: Temperature ¦ 1: Enthalpy (rotary exchanger) | D | R/W | - |
| | Bypass damper | | On/Off | - | 1 | 3 | 1: None ¦ 2: On/Off ¦ 3: Modulating | I | R/W | - |
| | Wheel min speed (Modulating rotary exchanger) | | 0% | % | 0 | 100 | 0…100% | I | R/W | - |
| | Defrost probe | | External-Return | - | 0 | 3 | 0: None ¦ 1: External-return ¦ 2: Exhaust ¦ 3: External | I | R/W | - |
| | Recovery heater | | No | | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Air quality | | | | | | | | | |
| Ha15 | Regulation type | | P+I | - | 1 | 2 | 1: Proportional ¦ 2: P+I | I | R/W | - |
| | Probe type | | CO2 | - | 1 | 3 | 1: CO2 ¦ 2: CO2+VOC ¦ 3: VOC | I | R/W | - |
| | Enable purging | | Yes | | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| Ha16 | Frost protection | | By probe | | | | 1: none ¦ 2: by frost-stat ¦ 3: by probe ¦ 4: by probe+frost-stat | I | R/W | - |
| | Enable unit On/Off | | | | | | | | | |
| Ha17 | By digit input | | Yes | | | | 0:No¦1:Yes | D | R/W | - |
| | By BMS | | No | | | | 0:No¦1:Yes | D | R/W | - |
| Ha18 | Setpoint from digital input | | No | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| Ha19 | Enable setpoint offset by analog input | | No | - | 0 | 1 | 0:No¦1:Yes | D | R/W | - |
| | Auxiliary regulation loop | | None | - | 0 | 4 | 0:None, 1…4 | I | R/W | - |
| | Regulation loop 1 | | | | | | | | | |
| | Regulation type | | Direct | - | 0 | 1 | 0: direct¦1: inverse | I | R/W | - |
| Ha20 | Output type | | Modul. +On/Off | - | 0 | 2 | 0: modulating+on/off ¦ 1: on/off ¦2: modulating | I | R/W | - |
| | Other management | | None | - | 0 | 2 | 0: none ¦ 1: on with supply fan ¦ 2: force with frost protection | I | R/W | - |
| | Regulation loop 2 | | | | | | | | | |
| | Regulation type | | Direct | - | 0 | 1 | 0: direct¦1: inverse | I | R/W | - |
| Ha21 | Output type | | Modul. + On/Off | - | 0 | 2 | 0: modulating+on/off ¦ 1: on/off ¦2: modulating | I | R/W | - |
| | Other management | | None | - | 0 | 2 | 0: none ¦ 1: on with supply fan ¦ 2: force with frost protection | I | R/W | - |
| | Regulation loop 3 | | | | | | | | | |
| | Regulation type | | Direct | - | 0 | 1 | 0: direct¦1: inverse | I | R/W | - |
| Ha22 | Output type | | Modul + On/Off | - | 0 | 2 | 0: modulating+on/off ¦ 1: on/off ¦2: modulating | I | R/W | - |
| | Other management | | None | - | 0 | 2 | 0: none ¦ 1: on with supply fan ¦ 2: force with frost protection | I | R/W | - |
| | Regulation loop 4 | | | | | | | | | |
| | Regulation type | | Direct | - | 0 | 1 | 0: direct¦1: inverse | I | R/W | - |
| Ha23 | Output type | | Modul + On/Off | - | 0 | 2 | 0: modulating+on/off ¦ 1: on/off ¦2: modulating | I | R/W | - |
| | Other management | | None | - | 0 | 2 | 0: none ¦ 1: on with supply fan ¦ 2: force with frost protection | I | R/W | - |
| | Protocol | | | | | | | | | |
| Ha24 | pLAN port | | pLAN | - | 0 | 21 | 5: pLAN ¦ 21:Modbus Master(*) | I | R/W | - |
| | BMS port | | BMS | - | 0 | 4 | 1:BMS ¦ 4:Winload | I | R/W | - |
| | Field port | | Modbus master | - | 1 | 21 | 1:Belimo ¦ 21:Modbus master | I | R/W | - |
| | Modbus Master settings | | | | | | | | | |
| Ha25 | Baudrate | | 19200 | Bit/s | 0 | 4 | 0: 1200 ¦ 1: 2400 ¦ 2: 4800 3: 9600 ¦ 4: 19200 | I | R/W | - |
| | Stop bit | | 2 | - | 1 | 2 | | I | R/W | - |
| | Parity mode | | None | - | | | 0:None ¦ 1:Even ¦ 2:Odd | I | R/W | - |
| | Timeout | | 300 | ms | 100 | 5000 | | I | R/W | - |
| | pCOe number | | 0 | - | 0 | 2 | | I | R/W | - |
| Ha26 | pCOe1 address | | 3 | - | 1 | 5 | | I | R/W | - |
| | pCOe2 address | | 4 | - | 1 | 5 | | I | R/W | - |
| | Number of serial probe | | None | | None | 6 | | I | R/W | - |
| Ha27 | Belimo device | | | | | | | | | |
| | Number of actuators | | 0 | - | 0 | 8 | | I | R/W | - |
| Ha28 | Press Enter to configure Belimo actuators➔Ha60 | | | | | | | | | |
| Ha29 | Press Enter to configure the VFD | | | | | | | | | |

| Mask Index | Display description | Description/ notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| Ha30 | Enable BMS probes and digital inputs | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| | Backup probe 1 | | None | - | None | Ain10 | 0: None; 1: Ain1…10: Ain10 | I | R/W | - |
| | Backup probe 2 | | None | - | None | Ain10 | 0: None; 1: Ain1…10: Ain10 | I | R/W | - |
| | Backup probe 3 | | None | - | None | Ain10 | 0: None; 1: Ain1…10: Ain10 | I | R/W | - |
| | Backup probe 4 | | None | - | None | Ain10 | 0: None; 1: Ain1…10: Ain10 | I | R/W | - |
| Ha31 | Press Enter to configure serial probes➔Ha91 | | | | | | | | | |
| Ha39 | Enable VFD: (Modbus protocol) | | | | | | No¦ Yes | D | R/W | |
| Ha40 | Supply VFD | | | | | | | | | |
| | Address | | 1 | - | 0 | 999 | | I | R/W | - |
| | Data address | | 0 | - | 0 | 9999 | | I | R/W | - |
| | Data value | | 0 | - | -32768 | 32767 | | I | R/W | - |
| | Default install (*) for pCO3 built-in | | N | No | Yes | 0:N=No ¦ 1:Y=Yes | D | R/W | | |
| Ha41 | Supply VFD | | | | | | | | | |
| | Control place | | I/O terminal | - | 1 | 3 | 1: I/O terminal ¦ 2:keypad ¦ 3: Fieldbus | I | R/W | - |
| | Speed reference type | | Ain1 | - | 0 | 5 | 0:Ain1 ¦ 1:Ain2 ¦ 2:Keypad ¦ 3: Fieldbus¦ 4: Motor potentiometer ¦5:PID regulation | I | R/W | - |
| | Rotation type | | Clock wise | - | 0 | 1 | 0:Clockwise ¦ 1: Counter-clockwise | D | R/W | - |
| Ha42 | Supply VFD | | | | | | | | | |
| | Motor control mode | | Frequency | - | 0 | 1 | 0:Frequency ¦ 1:Speed | I | R/W | - |
| | Start function | | Ramp | - | 0 | 1 | 0:Ramp ¦ 1: Flying start | I | R/W | - |
| | Stop function | | Coasting | - | 0 | 1 | 0:Coasting ¦ 1:Ramp | I | R/W | - |
| Ha43 | Supply VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #03;#09;#11;#15 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| Ha44 | Supply VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #16;#17;#29;#50 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| Ha45 | Supply VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #53;#54 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| | #55 | | none | - | 0 | 4 | 0:None ¦ 1:Warning (below limit)¦ 2:Warning (above limit) ¦ 3: Fault (below limit ¦ 4: Fault (above limit) | I | R/W | - |
| Ha46 | Supply VFD: motor parameters | | | | | | | | | |
| | Volt | | 0 | V | 180 | 690 | | I | R/W | - |
| | Cosfi | | 0.0 | - | 0,30 | 0,99 | | I | R/W | - |
| | Frequency | | 0 | Hz | 30 | 320 | | A | R/W | - |
| | Speed | | 0 | rpm | 300 | 20000 | | I | R/W | - |
| | Current | | 0 | A | -999,9 | 999,9 | | A | R/W | - |
| | Current limit | | 0 | A | 0 | 999,9 | | A | R/W | - |
| Ha50 | Return VFD | | | | | | | | | |
| | Address | | 2 | - | 0 | 999 | | I | R/W | - |
| | Data address | | 0 | - | 0 | 9999 | | I | R/W | - |
| | Data value | | 0 | - | -32768 | 32767 | | I | R/W | - |
| | Default install | | N | | N | S | 0:N=No¦ 1:S=Yes | D | R/W | - |
| Ha51 | Return VFD | | | | | | | | | |
| | Control place | | I/O terminal | - | 1 | 3 | 1: I/O terminal ¦ 2:keypad ¦ 3: Fieldbus | I | R/W | - |
| | Speed reference type | | Ain1 | - | 0 | 5 | 0:Ain1 ¦ 1:Ain2 ¦ 2:Keypad ¦ 3: Fieldbus¦ 4: Motor potentiometer ¦5:PID regulation | I | R/W | - |
| | Rotation type | | Clock wise | - | 0 | 1 | 0:Clockwise ¦ 1: Counter-clockwise | D | R/W | - |
| Ha52 | Return VFD | | | | | | | | | |
| | Motor control mode | | Frequency | - | 0 | 1 | 0:Frequency ¦ 1:Speed | I | R/W | - |
| | Start function | | Ramp | - | 0 | 1 | 0:Ramp ¦ 1: Flying start | I | R/W | - |
| | Stop function | | Coasting | - | 0 | 1 | 0:Coasting ¦ 1:Ramp | I | R/W | - |
| Ha53 | Return VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #03;#09;#11;#15 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| Ha54 | Return VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #16;#17;#29;#50 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| Ha55 | Return VFD | | | | | | | | | |
| | Action when in fault: | | | | | | | | | |
| | #53;#54 | | none | - | 0 | 3 | 0:None ¦ 1:Warning ¦ 2:Fault stop function ¦ 3: Fault coasting | I | R/W | - |
| | #55 | | none | - | 0 | 4 | 0:None ¦ 1:Warning (below limit)¦ 2:Warning (above limit) ¦ 3: Fault (below limit ¦ 4: Fault (above limit) | I | R/W | - |

| Mask Index | Display description | Description/ notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Return VFD: motor parameters | | | | | | | | | |
| | Volt | | 0 | V | 180 | 690 | | I | R/W | - |
| | Cosfi | | 0.0 | - | 0,30 | 0,99 | | I | R/W | - |
| Ha56 | Frequency | | 0 | Hz | 30 | 320 | | A | R/W | - |
| | Speed | | 0 | rpm | 300 | 20000 | | I | R/W | - |
| | Current | | 0 | A | -999,9 | 999,9 | | A | R/W | - |
| | Current limit | | 0 | A | 0 | 999,9 | | A | R/W | - |
| | | | | | | | | | | |
| Ha60 | Belimo 1…Belimo 8 | | | | | | | | | |
| Ha63 Ha66 Ha69 Ha72 | Actuator type | | None | - | 0 | 9 | 0-1: None ¦ 2: Air actuator ¦ 3,4: Valve actuator¦ 5: None ¦ 6: Firesmoke damper ¦ 7: None ¦ 8: VAV actuator¦ 9: None | I | R/W | - |
| Ha75 | Addressing mode | | Manual | - | 0 | 1 | 0: Manual ¦ 1: Auto | D | R/W | - |
| Ha78 | SN: 00000-00000-000-000 | | 0 | - | 0 | 9 | | I | R/W | - |
| Ha81 | Address actuator | Enable addres-sing | No | - | 0 | 1 | 0:No¦ 1:Yes | D | R/W | |
| Ha61 | Enable external input/probe | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| Ha64 Ha67 | Type | | NTC | - | | | 0:NTC ¦ 2:0…1V ¦ 3:0…10V ¦ 5: ON/ OFF | I | R/W | - |
| Ha70 | Min value | | 0 | - | -999.9 | Max | | A | R/W | - |
| Ha73 Ha76 Ha79 Ha82 | Max value | | 0 | - | Min | 999.9 | | A | R/W | - |
| Ha62 | Position or air flow limits | | | | | | | | | |
| Ha65 | Minimum | | 0 | % | 0 | Lim_max | | A | R/W | - |
| Ha68 Ha71 Ha74 Ha77 Ha80 Ha83 | Maximum | | 0 | % | Lim_min | 100 | | A | R/W | - |
| | Serial probe n°1…6 | | | | | | | | | |
| Ha91 | Address | | 128 | - | 128 | 159 | | I | R/W | - |
| … Ha96 | Type | | Temperature | - | 0 | 1 | 0:Temperature ¦ 1: Temperature+humidity | D | R/W | - |
| | Default installation | | No | - | No | Yes | 0:No¦ 1:Yes | D | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| b. | I/O Configuration | | | | | | | | | |
| | Analog input | | | | | | | | | |
| | Supply temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb01 | Type | | NTC | - | 0 | 4 | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | Return temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb02 | Type | | NTC | - | 0 | 4 | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | External temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb03 | Type | | NTC | - | - | - | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | Room temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb04 | Type | | NTC | - | - | - | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | Supply humidity | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb05 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | %U.R. | 0 | Max limit | | I | R/W | - |
| | Max limit | | | %U.R. | Min limit | 100 | | I | R/W | - |
| | Return humidity | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb06 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | %U.R. | 0 | Max limit | | I | R/W | - |
| | Max limit | | | %U.R. | Min limit | 100 | | I | R/W | - |
| | External humidity | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb07 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | %U.R. | 0 | Max limit | | I | R/W | - |
| | Max limit | | | %U.R. | Min limit | 100 | | I | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Room humidity | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb08 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | %U.R. | 0 | Max limit | | I | R/W | - |
| | Max limit | | | %U.R. | Min limit | 100 | | I | R/W | - |
| | Supply pressure position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb09 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | Pa | 0 | Max limit | | I | R/W | - |
| | Max limit | | | Pa | Min limit | 100 | | I | R/W | - |
| | Return pressure position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb10 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | | Pa | 0 | Max limit | | I | R/W | - |
| | Max limit | | | Pa | Min limit | 100 | | I | R/W | - |
| Hb11 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | Off-coil temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb12 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | I | R/W | - |
| | Min limit | | 0 | °C | -50 | Max limit | | A | R/W | - |
| Hb12 | Max limit | | 0 | °C | Min limit | 200 | | A | R/W | - |
| | CO2 air quality | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb13 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | ppm | 0 | Max limit | | A | R/W | - |
| | Max limit | | 2000 | ppm | Min limit | 5000 | | A | R/W | - |
| | VOC air quality position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb14 | Type | | | | | | 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Exhaust temperature | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb15 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Cooling coil water temperature | Ha06, Ha09, Hc11 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb16 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Preheat coil water temperature | Ha05, Ha09, Hc09 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb17 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Reheating coil water temperature | Ha08, Ha09, Hc16 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb18 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | A | R/W | - |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Regulation probe loop 1 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | | | |
| Hb19 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | | | |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Regulation probe loop 2 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | | | |
| Hb20 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | | | |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Regulation probe loop 3 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | | | |
| Hb21 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | | | |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |
| | Regulation probe loop 4 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | | | |
| Hb22 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | | | |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Temperature setpoint offset | Enable:Ha19 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | | | |
| Hb23 | Type | | | | | | 0:NTC ¦ 1:Pt1000 ¦ 2:0…1V ¦ 3:0…10V ¦ 4:4…20mA | | | |
| | Min limit | | 0 | % | 0 | Max limit | | A | R/W | - |
| | Max limit | | 100 | % | Min limit | 100 | | A | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| Digital inputs | | | | | | | | | | |
| | Remote On-Off | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Summer/winter | | | | | | | | | |
| Hb24 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Double setpoint | Ha18 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Generic alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Serious alarm | | | | | | | | | |
| Hb25 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Frost-stat | Enable:Ha16 | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | 1st Supply air filter | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | 2nd Supply air filter | | | | | | | | | |
| Hb26 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Return air filter | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Supply flow | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb27 | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Return flow | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Humidifier alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Inverter supply fan alarm | | | | | | | | | |
| Hb28 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Inverter return fan alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Supply fan overload | | | | | | | | | |
| | 1.Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | 2.Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb29 | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Return fan overload | | | | | | | | | |
| | 1.Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | 2.Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Cool pump 1 overload | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Preheat pump 1 overload | | | | | | | | | |
| Hb30 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Reheat pump 1 overload | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Cool pump 2 overload | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Preheat pump 2 overload | | | | | | | | | |
| Hb31 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Reheat pump 2 overload | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cooling flow alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Preheating flow alarm | | | | | | | | | |
| Hb32 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Reheating flow alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Heat recovery clogged | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Preheating heaters overload | | | | | | | | | |
| Hb33 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Reheating heaters overload | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Filter clogged | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Door switch | | | | | | | | | |
| Hb34 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Fire and smoke alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| Digital outputs | | | | | | | | | | |
| | Supply fan | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Return fan | | | | | | | | | |
| Hb35 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | On/Off humidifier | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Supply fan 2nd | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb36 | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Return fan 2nd | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NC | - | - | - | NC, NO | D | R/W | - |
| | Star – Delta logic | | | | | | | | | |
| Hb37 | Supply fan - Line | | -- | - | 0 | 16 | | I | R/W | - |
| | Supply fan - Star | | -- | - | 0 | 16 | | I | R/W | - |
| | Supply fan - Delta | | -- | - | 0 | 16 | | I | R/W | - |
| | Return fan - Line | | -- | - | 0 | 16 | | I | R/W | - |
| Hb38 | Return fan - Star | | -- | - | 0 | 16 | | I | R/W | - |
| | Return fan - Delta | | -- | - | 0 | 16 | | I | R/W | - |
| | Fresh air damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Bypass damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb39 | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Run around coil | Ha14: run around coil | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Rotary recovery | Ha14: rotary recovery on/off | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Global alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Serious alarm | | | | | | | | | |
| Hb40 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Minor alarm | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Unit status | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Filter alarm | | | | | | | | | |
| Hb41 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Recovery heater | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cool/heat | | | | | | | | | |
| Hb42 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | NO | - | - | - | NC, NO | D | R/W | - |

| Mask Index | Display description | | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cool – Cool/heat pump 1 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Preheat pump 1 | | | | | | | | | | |
| Hb43 | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Reheat pump 1 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cool – Cool/heat pump 2 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| Hb44 | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Preheat pump 2 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Reheat pump 2 | | | | | | | | | | |
| Hb44 | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cool - Cool/heat floating valve open | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Preheating floating valve open | | | | | | | | | | |
| Hb45 | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Reheating floating valve open | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cool - Cool/heat floating valve close | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Preheating floating valve close | | | | | | | | | | |
| Hb46 | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Reheating floating valve close | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cooling – cool/heat step 1 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cooling – cool/heat step 2 | | | | | | | | | | |
| Hb47 | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Cooling – cool/heat step 3 | | | | | | | | | | |
| | Position | | | -- | - | 0 | 99 | | I | R/W | - |
| | Logic | | | NO | - | - | - | NC, NO | D | R/W | - |
| | Preheating heaters | | | | | | | | | | |
| | 1 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 2 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb48 | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 3 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 4 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Reheating heaters | | | | | | | | | | |
| | 1 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 2 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb49 | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 3 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 4 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | Regulation loop on/off | | | | | | | | | | |
| | 1 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 2 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| Hb50 | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 3 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |
| | 4 | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | | Logic | | NO | - | - | - | NC, NO | D | R/W | - |

| Mask Index | Display description | Description/notes | Def. | UOM | Min | Max | Value description | Type | R/W | CAREL Addr. |
|---|---|---|---|---|---|---|---|---|---|---|
| Analog output | | | | | | | | | | |
| Hb51 | Supply fan | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb52 | Return fan position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb53 | Fresh air damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb54 | Mixing damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb55 | Exhaust damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb56 | Bypass damper | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb57 | Humidifier position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb58 | Preheating valve position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb59 | Cooling – Cool/heat valve position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb60 | Modulating preheating heaters | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb61 | Reheating valve | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb62 | Modulating reheaters position | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb63 | Rotary recovery | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb64 | Regulation loop 1 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb65 | Regulation loop 2 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb66 | Regulation loop 3 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb67 | Regulation loop 4 | | | | | | | | | |
| | Position | | -- | - | 0 | 99 | | I | R/W | - |
| | Minimum | | 0 | V | 0 | Max. | | A | R/W | - |
| | Maximum | | 0 | V | Min. | 10 | | A | R/W | - |
| Hb99 | Positions delete | | | | | | | | | |
| | Digital inputs | | No | - | 0 | 1 | 0:No¦ 1:Yes | D | R/W | - |
| | Analog inputs | | No | - | 0 | 1 | 0:No¦ 1:Yes | D | R/W | - |
| | Digital outputs | | No | - | 0 | 1 | 0:No¦ 1:Yes | D | R/W | - |
| | Analog outputs | | No | - | 0 | 1 | 0:No¦ 1:Yes | D | R/W | - |

c. Factory settings

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hc01 | Main regulation probe selection | | | | | | | | | |
| | Temperature | | Return | | | | 0:Return ¦ 1:Supply ¦ 2:Room | I | R | - |
| | Humidity | | Return | | | | 0:Return ¦ 1:Supply ¦ 2:Room | I | R | - |
| Hc02 | Dampers limits setting | | | | | | | | | |
| | Fresh air damper | | | % | 0 | 100 | | A | R/W | - |
| | Min | | | % | 0 | 100 | | A | R/W | - |
| | Max | | | % | 30 | 100 | | A | R/W | - |
| | Mixing damper | | | | | | | | | |
| | Min | | | % | 0 | 100 | | A | R/W | - |
| | Max | | | % | 0 | 100 | | A | R/W | - |
| Hc03 | Damper settings | | | | | | | | | |
| | Coil start delay when freecooling/ freeheating active | | 0 | min | 0 | 120 | | I | R/W | - |
| | Opening time | | 120 | s | 0 | 9999 | | I | R/W | - |
| | Closing delay | | 120 | s | 0 | 9999 | | I | R/W | - |
| Hc04 | Fans Star-Delta timing | | | | | | | | | |
| | Star - Line | | 2000 | ms | 0 | 99990 | | I | R/W | - |
| | Star | | 5000 | ms | 0 | 99990 | | I | R/W | - |
| | Star - Delta | | 500 | ms | 0 | 99990 | | I | R/W | - |
| Hc05 | Flow alarm threshold | Ha04: Air flow from: transducer | | | | | | | | |
| | Supply | | 100 | Pa | 0 | 9999 | | I | R/W | - |
| | Return | | 100 | Pa | 0 | 9999 | | I | R/W | - |
| | Differential | | 300 | Pa | 0 | 9999 | | I | R/W | - |
| Hc06 | Fans timing | Ha03: Fan type: On/Off (Backup fan) | | | | | | | | |
| | Stop delay | | 30 | s | 0 | 999 | | I | R/W | - |
| | Supply - Return | | 0 | s | 0 | 999 | | I | R/W | - |
| | Fan1-Fan2 delay | | 5 | s | 0 | 999 | | I | R/W | - |
| | Rotation time | | 0 | h | 0 | 999 | | I | R/W | - |
| | Overworking time | | 0 | s | -99 | 99 | | I | R/W | - |
| Hc07 | Fans flow alarm | | | | | | | | | |
| | Start-up delay | | 20 | s | 1 | 999 | | I | R/W | - |
| | Running delay | | 5 | s | 1 | 999 | | I | R/W | - |
| | Flow warning retries | | 0 | - | 0 | 5 | | I | R/W | - |
| Hc08 | Preheating coil | | | | | | | | | |
| | Floating valve running time | | 180 | s | 1 | 3200 | | I | R/W | - |
| Hc09 | Enable preheating coil water temperature threshold | | No | - | No | Yes | 0:No¦1:Yes | I | R/W | - |
| | Threshold | | 25 | °C | -99, | 99, | | A | R/W | - |
| | Differential | | 2 | °C | 0 | 9, | | A | R/W | - |
| Hc10 | Cooling coil | | | | | | | | | |
| | Floating valve running time | | 180 | s | 1 | 3200 | | I | R/W | - |
| Hc11 | Enable cooling coil water temperature threshold | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| | Threshold | | 35 | °C | -99.9 | 99.9 | | A | R/W | - |
| | Differential | | 2 | °C | 0 | 9.9 | | A | R/W | - |
| Hc12 | Delay between cooling/heating change | | 10 | min | 0 | 999 | | I | R/W | - |
| Hc13 | Heat/cool | | | | | | | | | |
| | Floating valve running time | | 180 | s | 1 | 3200 | | I | R/W | - |
| Hc14 | Enable heat/cool coil water temperature threshold | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| | Hot threshold | | 25 | °C | 0 | 99.9 | | A | R/W | - |
| | Cool threshold | | 35 | °C | 0 | 99.9 | | A | R/W | - |
| | Differential | | 2 | °C | 0 | 9.9 | | A | R/W | - |
| Hc15 | Reheating coil | | | | | | | | | |
| | Floating valve running time | | 180 | s | 0 | 3200 | | I | R/W | - |
| Hc16 | Enable reheating coil water temperature threshold | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| | Threshold | | 25 | °C | -99, | 99, | | A | R/W | - |
| | Differential | | 2 | °C | 0 | 9, | | A | R/W | - |
| Hc17 | Pumps | | | | | | | | | |
| | Alarm flow delay | | | | | | | | | |
| | Startup | | 30 | s | 1 | 999 | | I | R | - |
| | Running | | 15 | s | 1 | 999 | | I | R | - |
| | Pumps rotation time | | 96 | hour | 0 | 999 | | I | R/W | - |
| | Overwork time | | 0 | s | -99 | 99 | | I | R/W | - |
| Hc18 | Heat recovery | | | | | | | | | |
| | Defrost delay | | | | | | | | | |
| | Start | | 120 | s | 0 | 999 | | I | R/W | - |
| | End | | 60 | s | 0 | 999 | | I | R/W | - |
| | Clogged alarm delay | | 60 | s | 0 | 300 | | I | R/W | - |
| Hc19 | Air quality | | | | | | | | | |
| | Integral time | | 300 | s | 0 | 9999 | | I | R/W | - |
| | Cleaning time | | 10 | min | 0 | 300 | | I | R/W | - |
| Hc20 | Generic alarm input delay | | 0 | s | 0 | 9999 | | I | R/W | - |
| | Disable buzzer | | No | - | - | - | 0:No¦1:Yes | D | R/W | - |
| | Enable clock board | | No | - | - | - | 0:No¦1:Yes | D | R/W | - |
| Hc40 | Supply VFD | | | | | | | | | |
| | Volt at 0 Hz | | 0 | % | 0 | 40 | | A | R/W | - |
| | Switch frequency | | 0 | kHz | 1 | 16 | | A | R/W | - |
| | V/f curve midpoint | | | | | | | | | |
| | Voltage | | 0 | % | 0 | 100 | | A | R/W | - |
| | Frequency | | 0 | Hz | 0 | 320 | | A | R/W | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hc41 | Supply VFD | | | | | | | | | |
| | V/f ratio | | Linear | | | | 0:Linear ¦ 1:Squared ¦ 2:Programmable ¦ 3:Linear with flux optimisation | I | R/W | - |
| | V/f Optimisation | | Not used | | | | 0:Not used ¦ 1:Automatic boost | I | R/W | - |
| | Auto restart | | Not used | | | | 0:Not used ¦ 1:used | I | R/W | - |
| Hc42 | Supply VFD | | | | | | | | | |
| | Min frequency | | 0 | Hz | 0 | Max frequency | | A | R/W | - |
| | Max frequency | | 50 | Hz | Min frequency | 320 | | A | R/W | - |
| | Acceleration time | | 1 | s | 0.1 | 3200 | | A | R/W | - |
| | Deceleration time | | 1 | s | 0.1 | 3200 | | A | R/W | - |
| Hc50 | Return VFD | | | | | | | | | |
| | Volt at 0 Hz | | 0 | % | 0 | 40 | | A | R/W | - |
| | Switch frequency | | 0 | kHz | 1 | 16 | | A | R/W | - |
| | V/f curve midpoint | | | | | | | | | |
| | Voltage | | 0 | % | 0 | 100 | | A | R/W | - |
| | Frequency | | 0 | Hz | 0 | 320 | | A | R/W | - |
| Hc51 | Return VFD | | | | | | | | | |
| | V/f ratio | | Linear | | | | 0:Linear ¦ 1:Squared ¦ 2:Programmable ¦ 3:Linear with flux optimisation | I | R/W | - |
| | V/f Optimisation | | Not used | | | | 0:Not used ¦ 1:Automatic boost | I | R/W | - |
| | Auto restart | | Not used | | | | 0:Not used ¦ 1:used | I | R/W | - |
| Hc52 | Return VFD | | | | | | | | | |
| | Min frequency | | 0 | Hz | 0 | Max frequency | | A | R/W | - |
| | Max frequency | | 50 | Hz | Min frequency | 320 | | A | R/W | - |
| | Acceleration time | | 1 | s | 0.1 | 3200 | | A | R/W | - |
| | Deceleration time | | 1 | s | 0.1 | 3200 | | A | R/W | - |

d. Inizialization

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hd01 | Save configuration | | No | - | No | Yes | 0:No¦1:Yes | D | R/W | - |
| Hd02 | Default installation<br>Erase user settings and install global default values | | No | - | - | - | 0:No¦1:Yes | I | R/W | - |
| Hd03 | Insert new manufacture password (PW2) | | 1234 | - | 0 | 9999 | | I | R/W | - |

e. Input/output test

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| He01 | Digital output | | | | | | | | | |
| | Supply fan | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Supply fan 2 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Return fan | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Return fan 2 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He02 | Digital output | | | | | | | | | |
| | Supply fan line | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Supply fan star | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Supply fan delta | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Return fan line | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Return fan star | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Return fan delta | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He03 | Digital output | | | | | | | | | |
| | Unit status | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Humidifier | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Rotary recovery/ run around coil | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He04 | Digital output | | | | | | | | | |
| | Global alarm | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Serious alarm | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Minor alarm | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Filter alarm | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He05 | Digital output | | | | | | | | | |
| | Fresh air damper | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Bypass damper | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheater 1 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheater 2 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheater 3 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheater 4 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He06 | Digital output | | | | | | | | | |
| | Pre heater 1 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Pre heater 2 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Pre heater 3 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Pre heater 4 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He08 | Digital output | | | | | | | | | |
| | Pump 1 | | | | | | | | | |
| | Cooling – Cool/heat | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Preheating | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheating | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Digital output | | | | | | | | | |
| | Pump 2 | | | | | | | | | |
| He09 | Cooling – Cool/heat | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Preheating | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheating | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Digital output | | | | | | | | | |
| | Cooling – Cool/heat floating valve open | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He10 | Cooling – Cool/heat floating valve close | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Preheating floating valve open | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Preheating floating valve close | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheating floating valve open | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Reheating floating valve closed | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Digital output | | | | | | | | | |
| | Regulation loop 1 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| He11 | Regulation loop 2 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Regulation loop 3 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Regulation loop 4 | | Auto | - | Auto | On | 0:Auto ¦ 1:Off ¦ 2:On | I | R/W | - |
| | Analog output | | | | | | | | | |
| | Supply fan | | Auto | - | 0 | 100 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| He12 | Return fan | | Auto | - | 0 | 100 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Exhaust damper | | Auto | - | 0 | 100 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Fresh air damper | | Auto | - | 0 | 100 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Mixing damper | | Auto | - | 0 | 100 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Analog output | | | | | | | | | |
| | Bypass damper | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| He13 | Rotary recovery | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Preheat heater | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Reheat heater | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Analog output | | | | | | | | | |
| | Valve | | | | | | | | | |
| He14 | Cooling – Cool/heat | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Preheating | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Reheating | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Analog output | | | | | | | | | |
| | Regulation loop 1 | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| He15 | Regulation loop 2 | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Regulation loop 3 | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Regulation loop 4 | | Auto | - | 0 | 101 | 0:Auto ¦ 1:0% ¦ 101:100% | I | R/W | - |
| | Supply VFD | | | | | | | | | |
| He40 | Require | | 0 | % | 0 | 100 | | A | R/W | - |
| | Force VFD | | Stop | - | Stop | Run | 0: Stop ¦ 1: Run | D | R/W | - |
| | Return VFD | | | | | | | | | |
| He50 | Require | | 0 | % | 0 | 100 | | A | R/W | - |
| | Force VFD | | Stop | - | Stop | Run | 0: Stop ¦ 1: Run | D | R/W | - |

Tab. 9.a

## 9.1 BMS variables

FLSTDMAHUE can be connected to various supervisory systems, using the following BMS communication protocols: Carel and Modbus.
A BMS serial port serial port is used for the connection. The various connection protocols are managed using the following optional cards:

- Carel RS485: code PCOS004850
- Modbus RS485: code PCOS004850
- Lon Works FTT10: code PCO10000F0
- BACnet RS485: code PCO1000BA0
- BACnet Ethernet: code PCO1000WB0

The following list of variables specifies the variable identifier, visible via the Commissioning Tool: the description explains the meaning of the variable, while the last column specifies whether the BMS variable is read-only or read/write.

Digital variables

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | HeartBit | Heart beat | 0 | - | 0 | 1 | R / W |
| 3 | 2 | | Bms_Din_1 | Digital input 1 from BMS | 0 | - | 0 | 1 | R / W |
| 4 | 3 | | Bms_Din_2 | Digital input 2 from BMS | 0 | - | 0 | 1 | R / W |
| 5 | 4 | | Bms_Din_3 | Digital input 3 from BMS | 0 | - | 0 | 1 | R / W |
| 6 | 5 | | Bms_Din_4 | Digital input 4 from BMS | 0 | - | 0 | 1 | R / W |
| 7 | 6 | D07 | Din_On_Off | Status of Unit On/Off digital input | 0 | - | 0 | 1 | R |
| 8 | 7 | D07 | Din_Season | Select season from DI (cooling = open) | 0 | - | 0 | 1 | R |
| 9 | 8 | D07 | Din_Double_Set | Status of double set point selection digital input | 0 | - | 0 | 1 | R |
| 10 | 9 | D08 | Din_Generic | Generic alarm | 0 | - | 0 | 1 | R |
| 11 | 10 | D08 | AI_Din_Serious | AL U02 – Serious alarm from digital input | 0 | - | 0 | 1 | R |
| 12 | 11 | D08 | AI_Din_Humidifier | Humidifier alarm from digital input | 0 | - | 0 | 1 | R |
| 13 | 12 | D08 | AI_Antifreeze_Din | Frost protection alarm from digital input | 0 | - | 0 | 1 | R |
| 14 | 13 | D09 | Din_Supply_Filter | Supply filter alarm | 0 | - | 0 | 1 | R |
| 15 | 14 | D09 | Din_Supply_Filter_2 | Second supply filter alarm | 0 | - | 0 | 1 | R |
| 16 | 15 | D09 | Din_Return_Filter | Return filter alarm | 0 | - | 0 | 1 | R |
| 17 | 16 | D09 | Din_Supply_Flow | Supply flow alarm | 0 | - | 0 | 1 | R |
| 18 | 17 | D09 | Din_Return_Flow | Return flow alarm | 0 | - | 0 | 1 | R |
| 19 | 18 | D10 | Din_OverL_Pump1_Cool | Cooling coil pump 1 thermal overload | 0 | - | 0 | 1 | R |
| 20 | 19 | D10 | Din_OverL_Pump1_PreHeat | Preheating coil pump 1 thermal overload | 0 | - | 0 | 1 | R |
| 21 | 20 | D10 | Din_OverL_Pump1_PostHeat | Reheating coil pump 1 thermal overload | 0 | - | 0 | 1 | R |
| 22 | 21 | D11 | Din_OverL_Pump2_Cool | Cooling coil pump 2 thermal overload | 0 | - | 0 | 1 | R |
| 23 | 22 | D11 | Din_OverL_Pump2_PreHeat | Preheating coil pump 2 thermal overload | 0 | - | 0 | 1 | R |
| 24 | 23 | D11 | Din_OverL_Pump2_PostHeat | Reheating coil pump 2 thermal overload | 0 | - | 0 | 1 | R |
| 25 | 24 | D12 | Din_Cool_Flow | Cooling coil flow alarm | 0 | - | 0 | 1 | R |
| 26 | 25 | D12 | Din_PostHeat_Flow | Reheating coil flow alarm | 0 | - | 0 | 1 | R |
| 27 | 26 | D12 | Din_PreHeat_Flow | Reheating coil flow alarm | 0 | - | 0 | 1 | R |
| 28 | 27 | D13 | Din_OverL_Supply_Fan_1 | Supply fan 1 thermal overload | 0 | - | 0 | 1 | R |
| 29 | 28 | D13 | Din_OverL_Supply_Fan_2 | Supply fan 2 thermal overload | 0 | - | 0 | 1 | R |
| 30 | 29 | D13 | Din_OverL_Return_Fan_1 | Return fan 1 thermal overload | 0 | - | 0 | 1 | R |
| 31 | 30 | D13 | Din_OverL_Return_Fan_2 | Return fan 2 thermal overload | 0 | - | 0 | 1 | R |
| 32 | 31 | D14 | Din_Supply_Inv_Fan_Alarm | Supply inverter alarm from DI | 0 | - | 0 | 1 | R |
| 33 | 32 | D14 | Din_Return_Inv_Fan_Alarm | Return inverter alarm from DI | 0 | - | 0 | 1 | R |
| 34 | 33 | D14 | Din_OverL_PreH_Heaters | Preheating heater overload | 0 | - | 0 | 1 | R |
| 35 | 34 | D14 | Din_OverL_PostH_Heaters | Reheating heater overload | 0 | - | 0 | 1 | R |
| 36 | 35 | D15 | Din_Dirty_Recovery | Dirty heat recovery unit alarm from DI | 0 | - | 0 | 1 | R |
| 37 | 36 | D15 | AL U08 - Filter clogged alarm | Filter alarm | 0 | - | 0 | 1 | R |
| 38 | 37 | D15 | AL U06 - Fire&Smoke alarm by digit input | Smoke-fire alarm | 0 | - | 0 | 1 | R |
| 39 | 38 | D15 | AL U07 - Open door alarm by digit input | Door open alarm | 0 | - | 0 | 1 | R |
| 40 | 39 | D17 | On_Off_Supply_Fan_1 | Supply fan 1 on/Off output | 0 | - | 0 | 1 | R |
| 41 | 40 | D17 | On_Off_Supply_Fan_2 | Supply fan 2 on/Off output | 0 | - | 0 | 1 | R |
| 42 | 41 | D17 | On_Off_Return_Fan_1 | Return fan 1 on/Off output | 0 | - | 0 | 1 | R |
| 43 | 42 | D17 | On_Off_Return_Fan_2 | Return fan 2 on/Off output | 0 | - | 0 | 1 | R |
| 44 | 43 | D18 | Supply_Fan_Line | Supply fan line | 0 | - | 0 | 1 | R |
| 45 | 44 | D18 | Return_Fan_Line | Return fan line | 0 | - | 0 | 1 | R |
| 46 | 45 | D19 | SysOn | System On/Off status | 0 | - | 0 | 1 | R |
| 47 | 46 | D19 | On_Off_Humidifier | Humidifier On/Off output | 0 | - | 0 | 1 | R |
| 48 | 47 | D19 | On_Off_Rotary_Recovery | Heat wheel On/Off output | 0 | - | 0 | 1 | R |
| 49 | 48 | D19 | Recovery_Heater | Heat recovery unit defrost heater outputs | 0 | - | 0 | 1 | R |
| 50 | 49 | D20 | General alarm output | General alarm | 0 | - | 0 | 1 | R |
| 51 | 50 | D20 | AI_Serious | AL U02 – Serious alarm | 0 | - | 0 | 1 | R |
| 52 | 51 | D20 | AI_Minor | Minor alarm | 0 | - | 0 | 1 | R |
| 53 | 52 | D20 | AI_Filters | Filter alarm output | 0 | - | 0 | 1 | R |
| 54 | 53 | D21 | On_Off_External_Damper | Outside damper On/Off output | 0 | - | 0 | 1 | R |
| 55 | 54 | D21 | On_Off_ByPass_Damper | Bypass damper On/Off output | 0 | - | 0 | 1 | R |
| 56 | 55 | D21 | Heaters_Post_1 | Reheating heater output 1 | 0 | - | 0 | 1 | R |
| 57 | 56 | D21 | Heaters_Post_2 | Reheating heater output 2 | 0 | - | 0 | 1 | R |
| 58 | 57 | D21 | Heaters_Post_3 | Reheating heater output 3 | 0 | - | 0 | 1 | R |
| 59 | 58 | D21 | Heaters_Post_4 | Reheating heater output 4 | 0 | - | 0 | 1 | R |
| 60 | 59 | D22 | Heaters_Pre_1 | Preheating heater output 1 | 0 | - | 0 | 1 | R |
| 61 | 60 | D22 | Heaters_Pre_2 | Preheating heater output 2 | 0 | - | 0 | 1 | R |
| 62 | 61 | D22 | Heaters_Pre_3 | Preheating heater output 3 | 0 | - | 0 | 1 | R |
| 63 | 62 | D22 | Heaters_Pre_4 | Preheating heater output 4 | 0 | - | 0 | 1 | R |
| 64 | 63 | D23 | Cool_Step_1 | Cooling step 1 | 0 | - | 0 | 1 | R |
| 65 | 64 | D23 | Cool_Step_2 | Cooling step 2 | 0 | - | 0 | 1 | R |
| 66 | 65 | D23 | Cool_Step_3 | Cooling step 3 | 0 | - | 0 | 1 | R |
| 67 | 66 | D23 | Common_Cool_Heat | Heat or cool mode for heating/cooling coil | 0 | - | 0 | 1 | R |
| 68 | 67 | D24 | Cool_Pump_1 | Cooling or heating/cooling coil pump 1 output | 0 | - | 0 | 1 | R |
| 69 | 68 | D24 | PreHeat_Pump_1 | Preheating coil pump 1 output | 0 | - | 0 | 1 | R |
| 70 | 69 | D24 | PostHeat_Pump_1 | Reheating coil pump 1 output | 0 | - | 0 | 1 | R |
| 71 | 70 | D25 | Cool_Pump_2 | Cooling or heating/cooling coil pump 2 output | 0 | - | 0 | 1 | R |
| 72 | 71 | D25 | PreHeat_Pump_2 | Preheating coil pump 2 output | 0 | - | 0 | 1 | R |

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 73 | 72 | D25 | PostHeat_Pump_2 | Reheating coil pump 2 output | 0 | - | 0 | 1 | R |
| 74 | 73 | D26 | Cool_3P_Open | Close floating cooling or heating/cooling coil valve | 0 | - | 0 | 1 | R |
| 75 | 74 | D26 | Cool_3P_Close | Close floating cooling or heating/cooling coil valve | 0 | - | 0 | 1 | R |
| 76 | 75 | D26 | PreHeat_3P_Open | Open preheating coil floating valve | 0 | - | 0 | 1 | R |
| 77 | 76 | D26 | PreHeat_3P_Close | Close preheating coil floating valve | 0 | - | 0 | 1 | R |
| 78 | 77 | D26 | PostHeat_3P_Open | Open reheating coil floating valve | 0 | - | 0 | 1 | R |
| 79 | 78 | D26 | PostHeat_3P_Close | Close reheating coil floating valve | 0 | - | 0 | 1 | R |
| 80 | 79 | D27 | OnOff_Auxiliary_1 | Auxiliary loop 1 On/Off | 0 | - | 0 | 1 | R |
| 81 | 80 | D27 | OnOff_Auxiliary_2 | Auxiliary loop 2 On/Off | 0 | - | 0 | 1 | R |
| 82 | 81 | D27 | OnOff_Auxiliary_3 | Auxiliary loop 3 On/Off | 0 | - | 0 | 1 | R |
| 83 | 82 | D27 | OnOff_Auxiliary_4 | Auxiliary loop 4 On/Off | 0 | - | 0 | 1 | R |
| 84 | 83 | A01 | SCHEDULER.En_Resume_time | Enable resume time | 0 | - | 0 | 1 | R / W |
| 85 | 84 | | SCHEDULER.Write_Data | Write scheduler hour/minute settings | 0 | - | 0 | 1 | R / W |
| 86 | 85 | C02 | SCHEDULER.Day_Scheduler_En | Enable Scheduler | 0 | - | 0 | 1 | R / W |
| 87 | 86 | C03 | SCHEDULER.Holiday_Period_En | Enable holiday period for scheduler | 0 | - | 0 | 1 | R / W |
| 88 | 87 | C04 | SCHEDULER.Special_Days_En | Enable special days for scheduler | 0 | - | 0 | 1 | R / W |
| 89 | 88 | C05 | Dst.En_DST | Enable daylight saving | 0 | - | 0 | 1 | R / W |
| 90 | 89 | | AI_Regulation_Probe | AL A24 – Control probe fault or disconnected | 0 | - | 0 | 1 | R |
| 91 | 90 | | AI_Recovery_Dirty | AL B01 – Dirty heat recovery unit | 0 | - | 0 | 1 | R |
| 92 | 91 | | AI_PostH_Heaters | AL B02 – Reheating heater alarm | 0 | - | 0 | 1 | R/W |
| 93 | 92 | | AI_PreH_Heaters | AL B03 – Preheating heater alarm | 0 | - | 0 | 1 | R/W |
| 94 | 93 | | AI_pCOe_1_Offline | AL E11 - pCOe 1 offline | 0 | - | 0 | 1 | R |
| 95 | 94 | | AI_pCOe_2_Offline | AL E21 - pCOe 2 offline | 0 | - | 0 | 1 | R |
| 96 | 95 | | Warning_Ain_1_2_pCOe_1 | AL E12 - Analogue inputs 1&2 on pCOe1 not same type | 0 | - | 0 | 1 | R/W |
| 97 | 96 | | Warning_Ain_3_4_pCOe_1 | AL E13 - Analogue inputs 3&4 on pCOe1 not same type | 0 | - | 0 | 1 | R/W |
| 98 | 97 | | Warning_Ain_1_2_pCOe_2 | AL E22 - Analogue inputs 1&2 on pCOe2 not same type | 0 | - | 0 | 1 | R/W |
| 99 | 98 | | Warning_Ain_3_4_pCOe_2 | AL E23 - Analogue inputs 3&4 on pCOe2 not same type | 0 | - | 0 | 1 | R/W |
| 100 | 99 | | AI_AinCh1 | AL E14 – Analogue probe alarm on channel 1 | 0 | - | 0 | 1 | R |
| 101 | 100 | | AI_AinCh2 | AL E15 - Analogue probe alarm on channel 2 | 0 | - | 0 | 1 | R |
| 102 | 101 | | AI_AinCh3 | AL E16 - Analogue probe alarm on channel 1 | 0 | - | 0 | 1 | R/W |
| 103 | 102 | | AI_AinCh4 | AL E14 - Analogue probe alarm on channel 4 | 0 | - | 0 | 1 | R/W |
| 104 | 103 | | AI_AinCh1 | AL E24 - Analogue probe alarm on channel 1 | 0 | - | 0 | 1 | R |
| 105 | 104 | | AI_AinCh2 | AL E25 - Analogue probe alarm on channel 2 | 0 | - | 0 | 1 | R |
| 106 | 105 | | AI_AinCh3 | AL E26 - Analogue probe alarm on channel 1 | 0 | - | 0 | 1 | R/W |
| 107 | 106 | | AI_AinCh4 | AL E27 - Analogue probe alarm on channel 4 | 0 | - | 0 | 1 | R/W |
| 108 | 107 | | AI_Supply_Flow_1 | AL F01 – Supply fan 1 flow alarm | 0 | - | 0 | 1 | R |
| 109 | 108 | | AI_Supply_Flow_2 | AL F03 - Supply fan 2 flow alarm | 0 | - | 0 | 1 | R |
| 110 | 109 | | AI_Return_Flow_1 | AL F02 - Return fan 1 flow alarm | 0 | - | 0 | 1 | R |
| 111 | 110 | | AI_Return_Flow_2 | AL F04 - Return fan 2 flow alarm | 0 | - | 0 | 1 | R |
| 112 | 111 | | AI_Supply_Overload_1 | AL F05 - Supply fan 1 thermal overload alarm | 0 | - | 0 | 1 | R |
| 113 | 112 | | AI_Supply_Overload_2 | AL F09 - Supply fan 2 thermal overload alarm | 0 | - | 0 | 1 | R |
| 114 | 113 | | AI_Return_Overload_1 | AL F06 - Return fan 1 thermal overload alarm | 0 | - | 0 | 1 | R |
| 115 | 114 | | AI_Return_Overload_2 | AL F10 - Return fan 2 thermal overload alarm | 0 | - | 0 | 1 | R |
| 116 | 115 | | AI_Din_Supply_Inv_Fan | AL F07 - Supply inverter alarm | 0 | - | 0 | 1 | R |
| 117 | 116 | | AI_Din_Return_Inv_Fan | AL F08 - Return inverter alarm | 0 | - | 0 | 1 | R |
| 118 | 117 | | Warning_Sfan1 | AL F11 - Supply fan 1 warning | 0 | - | 0 | 1 | R |
| 119 | 118 | | Warning_Sfan2 | AL F12 - Supply fan 2 warning | 0 | - | 0 | 1 | R |
| 120 | 119 | | Warning_RFan1 | AL F13 - Return fan 1 warning | 0 | - | 0 | 1 | R |
| 121 | 120 | | Warning_RFan2 | AL F14 - Return fan 2 warning | 0 | - | 0 | 1 | R |
| 122 | 121 | | AI_Extd_Memory | AL G02 - Extended memory error | 0 | - | 0 | 1 | R/W |
| 123 | 122 | | AI_Antifreeze_Ain | AL G03 - Frost protection alarm from probe | 0 | - | 0 | 1 | R |
| 124 | 123 | | AI_Antifreeze_Din | AL G04 - Frost protection alarm from thermostat | 0 | - | 0 | 1 | R |
| 125 | 124 | | Protect_Mode | AL G05 – Room protection active | 0 | - | 0 | 1 | R |
| 126 | 125 | | AI_Humidifier | AL H01 – Humidifier alarm | 0 | - | 0 | 1 | R |
| 127 | 126 | | Belimo_1.AI_Belimo_Offline | AL M11 - Belimo 1 offline | 0 | - | 0 | 1 | R |
| 128 | 127 | | Belimo_2.AI_Belimo_Offline | AL M21 - Belimo 2 offline | 0 | - | 0 | 1 | R |
| 129 | 128 | | Belimo_3.AI_Belimo_Offline | AL M31 - Belimo 3 offline | 0 | - | 0 | 1 | R |
| 130 | 129 | | Belimo_4.AI_Belimo_Offline | AL M41 - Belimo 4 offline | 0 | - | 0 | 1 | R |
| 131 | 130 | | Belimo_5.AI_Belimo_Offline | AL M51 - Belimo 5 offline | 0 | - | 0 | 1 | R |
| 132 | 131 | | Belimo_6.AI_Belimo_Offline | AL M61 - Belimo 6 offline | 0 | - | 0 | 1 | R |
| 133 | 132 | | Belimo_7.AI_Belimo_Offline | AL M71 - Belimo 7 offline | 0 | - | 0 | 1 | R |
| 134 | 133 | | Belimo_8.AI_Belimo_Offline | AL M81 - Belimo 8 offline | 0 | - | 0 | 1 | R |
| 135 | 134 | | Warning_Cool_Pump1 | AL P01 – Cooling pump 1 flow warning | 0 | - | 0 | 1 | R |
| 136 | 135 | | Warning_Cool_Pump2 | AL P02 - Cooling pump 2 flow warning | 0 | - | 0 | 1 | R |
| 137 | 136 | | Warning_PreH_Pump1 | AL P07 - Preheating pump 1 flow warning | 0 | - | 0 | 1 | R |
| 138 | 137 | | Warning_PreH_Pump2 | AL P08 - Preheating pump 2 flow warning | 0 | - | 0 | 1 | R |
| 139 | 138 | | Warning_PostH_Pump1 | AL P13 - Reheating pump 1 flow warning | 0 | - | 0 | 1 | R |
| 140 | 139 | | Warning_PostH_Pump2 | AL P14 - Reheating pump 2 flow warning | 0 | - | 0 | 1 | R |
| 141 | 140 | | Cool_Pumps.AI_Flow_Pump_1 | AL P03 – Cooling pump 1 flow alarm | 0 | - | 0 | 1 | R |
| 142 | 141 | | Cool_Pumps.AI_Flow_Pump_2 | AL P04 - Cooling pump 2 flow alarm | 0 | - | 0 | 1 | R |
| 143 | 142 | | PreHeat_Pumps.AI_Flow_Pump_1 | AL P09 - Preheating pump 1 flow alarm | 0 | - | 0 | 1 | R |
| 144 | 143 | | PreHeat_Pumps.AI_Flow_Pump_2 | AL P10 - Preheating pump 2 flow alarm | 0 | - | 0 | 1 | R |
| 145 | 144 | | ReHeat_Pumps.AI_Flow_Pump_1 | AL P15 - Reheating pump 1 flow alarm | 0 | - | 0 | 1 | R |
| 146 | 145 | | ReHeat_Pumps.AI_Flow_Pump_2 | AL P16 - Reheating pump 2 flow alarm | 0 | - | 0 | 1 | R |
| 147 | 146 | | Cool_Pumps.AI_Overload_1 | AL P05 - Cooling pump 1 overload | 0 | - | 0 | 1 | R |
| 148 | 147 | | Cool_Pumps.AI_Overload_2 | AL P06 - Cooling pump 2 overload | 0 | - | 0 | 1 | R |
| 149 | 148 | | PreHeat_Pumps.AI_Overload_1 | AL P11 - Preheating pump 1 overload | 0 | - | 0 | 1 | R |
| 150 | 149 | | PreHeat_Pumps.AI_Overload_2 | AL P12 - Preheating pump 2 overload | 0 | - | 0 | 1 | R |
| 151 | 150 | | ReHeat_Pumps.AI_Overload_1 | AL P17 - Reheating pump 1 overload | 0 | - | 0 | 1 | R |
| 152 | 151 | | ReHeat_Pumps.AI_Overload_2 | AL P18 - Reheating pump 2 overload | 0 | - | 0 | 1 | R |
| 153 | 152 | | AI_Din_Generic | AL U01 - Generic alarm from digital input | 0 | - | 0 | 1 | R |
| 154 | 153 | | AI_Din_Supply_Filter | AL U03 - Supply filter alarm | 0 | - | 0 | 1 | R |
| 155 | 154 | | AI_Din_Supply_Filter_2 | AL U04 - 2nd supply filter alarm | 0 | - | 0 | 1 | R |
| 156 | 155 | | AI_Din_Return_Filter | AL U05 - Return filter alarm | 0 | - | 0 | 1 | R |
| 157 | 156 | | AI_Serial_Prb_Offline_1 | AL S12 - Serial probe 1 offline | 0 | - | 0 | 1 | R |

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 158 | 157 | | AI_Serial_Prb_Offline_2 | AL S22 - Serial probe 2 offline | 0 | - | 0 | 1 | R |
| 159 | 158 | | AI_Serial_Prb_Offline_3 | AL S32 - Serial probe 3 offline | 0 | - | 0 | 1 | R |
| 160 | 159 | | AI_Serial_Prb_Offline_4 | AL S42 - Serial probe 4 offline | 0 | - | 0 | 1 | R |
| 161 | 160 | | AI_Serial_Prb_Offline_5 | AL S52 - Serial probe 5 offline | 0 | - | 0 | 1 | R |
| 162 | 161 | | AI_Serial_Prb_Offline_6 | AL S62 - Serial probe 6 offline | 0 | - | 0 | 1 | R |
| 163 | 162 | | AI_Offline_VFD1 | AL V11 - Supply VFD offline | 0 | - | 0 | 1 | R |
| 164 | 163 | | AI_Offline_VFD2 | AL V21 - Return VFD offline | 0 | - | 0 | 1 | R |
| 165 | 164 | | AI_Inlet_Cool_Temp | AL B04 - Cooling water temperature fault | 0 | - | 0 | 1 | R |
| 166 | 165 | | AI_Inlet_PreH_Temp | AL B05 - Preheating water temperature fault | 0 | - | 0 | 1 | R |
| 167 | 166 | | AI_Inlet_PostH_Temp | AL B06 - Reheating water temperature fault | 0 | - | 0 | 1 | R |
| 168 | 167 | | AI_Inlet_Common_Coil_Temp | AL B07 - Cool / Heat water temperature fault | 0 | - | 0 | 1 | R |
| 169 | 168 | Gfc04 | TEMP_REG.Regulation_Mode | Season/Auto regulation | 0 | - | 0 | 1 | R / W |
| 170 | 169 | Gfc07 | TEMP_REG.En_Double_Actions | Enable automatic heat/cool selection (on seasonal set point) | 0 | - | 0 | 1 | R / W |
| 171 | 170 | Gfc10 | HUMID_REG.Regulation_Mode | Enable automatic humidify/dehumidify selection | 0 | - | 0 | 1 | R / W |
| 172 | 171 | Gfc14 | Temp_Hum_Priority | Temperature or humidity control priority | 0 | - | 0 | 1 | R / W |
| 173 | 172 | Gfc34 | SCHEDULER.Set_Protection_En | Enable room temperature protection | 0 | - | 0 | 1 | R / W |
| 174 | 173 | Gfc35 | HUMIDIFIER.En_Sup_LT_Lim_Ctrl | Enable minimum supply temperature limit with adiabatic humidifier | 0 | - | 0 | 1 | R / W |
| 175 | 174 | | SCHEDULER.Summer_Winter_Auto_Fix | Set cool/heat selection, automatic or fixed days | 0 | - | 0 | 1 | R / W |
| 176 | 175 | | AIR_QUALITY.Msk_Start_Cleaning | Start purge control with outside air | 0 | - | 0 | 1 | R / W |
| 177 | 176 | | AIR_QUALITY.Msk_Stop_Cleaning | Stop purge control with outside air | 0 | - | 0 | 1 | R / W |
| 178 | 177 | | Supply_VFD_1.Reset_VFD_Alarms | Reset supply VFD alarms | 0 | - | 0 | 1 | R / W |
| 179 | 178 | | Return_VFD_1.Reset_VFD_Alarms | Reset return VFD alarms | 0 | - | 0 | 1 | R / W |
| 180 | 179 | | BMS_Season | Cool/heat selection | 0 | - | 0 | 1 | R / W |
| 181 | 180 | | Superv_On_Off | | 0 | - | 0 | 1 | R / W |
| 208 | 207 | | Reset_Alarm_BMS | Reset alarms from BMS | 0 | - | 0 | 1 | R / W |

Tab. 9.b

Analogue variables

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | Bms_Ain_1 | Analogue input 1 from supervisor | 0 | - | -99.9 | 99.9 | R / W |
| 3 | 2 | | Bms_Ain_2 | Analogue input 2 from supervisor | 0 | - | -99.9 | 99.9 | R / W |
| 4 | 3 | | Bms_Ain_3 | Analogue input 3 from supervisor | 0 | - | -99.9 | 99.9 | R / W |
| 5 | 4 | | Bms_Ain_4 | Analogue input 4 from supervisor | 0 | - | -99.9 | 99.9 | R / W |
| 6 | 5 | | | Reserved | | | | | |
| 7 | 6 | | | Reserved | | | | | |
| 8 | 7 | | | Reserved | | | | | |
| 9 | 8 | | | Reserved | | | | | |
| 10 | 9 | | | Reserved | | | | | |
| 11 | 10 | D01 | Supply_Temp | Supply temperature | 0 | °C | -99.9 | 99.9 | R |
| 12 | 11 | D01 | Return_Temp | Return temperature | 0 | °C | -99.9 | 3276.7 | R |
| 13 | 12 | D01 | Room_Temp | Room temperature | 0 | °C | -99.9 | 99.9 | R |
| 14 | 13 | | Supply_Humid | Supply humidity | 0 | %rH | 0 | 99.9 | R |
| 15 | 14 | | Return_Humid | Return humidity | 0 | %rH | 0 | 99.9 | R |
| 16 | 15 | | Room_Humid | Room humidity | 0 | %rH | 0 | 99.9 | R |
| 17 | 16 | D02 | External_Temp | Outside temperature | 0 | °C | -99.9 | 3276.7 | R |
| 18 | 17 | | External_Humid | Outside humidity | 0 | %rH | 0 | 99.9 | R |
| 19 | 18 | D03 | Freeze_Temp | Frost protection temperature | 0 | °C | -99.9 | 99.9 | R |
| 20 | 19 | D03 | Saturation_Temp | Saturation temperature | 0 | °C | -99.9 | 99.9 | R |
| 21 | 20 | D03 | Exhaust_Temp | Exhaust temperature | 0 | °C | -99.9 | 99.9 | R |
| 22 | 21 | | Air_Quality_VOC | Air quality in VOC | 0 | % | 0 | 100 | R |
| 23 | 22 | D04 | Cool_Coil_Temp | Cooling - heating/cooling coil water temperature | 0 | °C | -99.9 | 99.9 | R |
| 24 | 23 | D04 | PreHeat_Coil_Temp | Preheating coil water temperature | 0 | °C | -99.9 | 99.9 | R |
| 25 | 24 | D04 | PostHeat_Coil_Temp | Reheating coil water temperature | 0 | °C | -99.9 | 99.9 | R |
| 26 | 25 | B01, D05 | Temp_Setp_Offset | Set point offset | 0 | °C | -99.9 | 99.9 | R |
| 27 | 26 | D05 | Auxiliary_1 | Auxiliary loop 1 analog intput | 0 | - | -3200 | 3200 | R |
| 28 | 27 | D05 | Auxiliary_2 | Auxiliary loop 2 analog intput | 0 | - | -3200 | 3200 | R |
| 29 | 28 | D05 | Auxiliary_3 | Auxiliary loop 3 analog intput | 0 | - | -3200 | 3200 | R |
| 30 | 29 | D05 | Auxiliary_4 | Auxiliary loop 4 analog intput | 0 | - | -3200 | 3200 | R |
| 31 | 30 | | Supply_Enth | Supply enthalpy | 0 | kJ/kg | 0 | 999.9 | R |
| 32 | 31 | | Return_Enth | Return enthalpy | 0 | kJ/kg | 0 | 999.9 | R |
| 33 | 32 | | Room_Enth | Room enthalpy | 0 | kJ/kg | 0 | 999.9 | R |
| 34 | 33 | | External_Enth | Outside air enthalpy | 0 | kJ/kg | 0 | 999.9 | R |
| 35 | 34 | | Setp_Enth | Enthalpy set point | 0 | kJ/kg | 0 | 999.9 | R |
| 36 | 35 | D28 | Mod_Supply_Fan | Supply fan modulating output | 0 | % | 0 | 100 | R |
| 37 | 36 | D28 | Mod_Return_Fan | Return fan modulating output | 0 | % | 0 | 100 | R |
| 38 | 37 | D28 | Mod_Exhaust_Damper | Exhaust damper modulating output | 0 | % | 0 | 100 | R |
| 39 | 38 | D28 | Mod_External_Damper | Outside damper modulating output | 0 | % | 0 | 100 | R |
| 40 | 39 | D29 | Mod_ByPass_Damper | Bypass damper modulating output | 0 | % | 0 | 100 | R |
| 41 | 40 | D28 | Mod_Mixing_Damper | Mixing damper modulating output | 0 | % | 0 | 100 | R |
| 42 | 41 | D30 | Mod_Humidifier | Humidifier modulating output | 0 | % | 0 | 100 | R |
| 43 | 42 | D29 | Mod_PostH_Heater_Inv | Reheating heater modulating output | 0 | % | 0 | 999.9 | R |
| 44 | 43 | D29 | Mod_PreH_Heater_Inv | Preheating heater modulating output | 0 | % | 0 | 999.9 | R |
| 45 | 44 | D29 | Mod_Rotary_Recovery | Heat wheel modulating output | 0 | % | 0 | 100 | R |
| 46 | 45 | D30 | Mod_Valve_cool | Cooling–heating/cooling valve modulating output | 0 | % | 0 | 100 | R |
| 47 | 46 | D30 | Mod_Valve_PostHeat | Reheat valve modulating output | 0 | % | 0 | 100 | R |
| 48 | 47 | D30 | Mod_Valve_PreHeat | Preheat valve modulating output | 0 | % | 0 | 100 | R |
| 49 | 48 | D31 | Mod_Auxiliary_1 | Modulating output auxiliary loop 1 | 0 | % | 0 | 100 | R |
| 50 | 49 | D31 | Mod_Auxiliary_2 | Modulating output auxiliary loop 2 | 0 | % | 0 | 100 | R |
| 51 | 50 | D31 | Mod_Auxiliary_3 | Modulating output auxiliary loop 3 | 0 | % | 0 | 100 | R |
| 52 | 51 | D31 | Mod_Auxiliary_4 | Modulating output auxiliary loop 4 | 0 | % | 0 | 100 | R |
| 53 | 52 | | VFDs_Status | Supply and return VFD status | 0 | - | -3276.8 | -3276.7 | R |
| 54 | 53 | D41 | Supply_VFD_1.Speed_Require | Supply VFD speed request (Hz) | 0 | - | 0 | 100 | R |
| 55 | 54 | D42 | Supply_VFD_1.Voltage | Supply VFD voltage (V) | 0 | V | -999.9 | -999.9 | R |
| 56 | 55 | D42 | Supply_VFD_1.Current | Supply VFD current (A) | 0 | - | -99.9 | 99.9 | R |
| 57 | 56 | D42 | Supply_VFD_1.Torque | Supply VFD torque (Nm) | 0 | % | -999.9 | 999.9 | R |
| 58 | 57 | D42 | Supply_VFD_1.Power | Supply VFD power (Watt) | 0 | % | -999.9 | 999.9 | R |
| 59 | 58 | | Supply_Speed_Hz | Supply VFD speed (Hz) | 0 | Hz | -99.9 | 99.9 | R |
| 60 | 59 | D51 | Return_VFD_1.Speed_Require | Return VFD speed request (Hz) | 0 | - | 0 | 100 | R/W |
| 61 | 60 | D52 | Return_VFD_1.Voltage | Return VFD voltage (V) | 0 | V | -999.9 | -999.9 | R |
| 62 | 61 | D52 | Return_VFD_1.Current | Return VFD current (A) | 0 | - | -99.9 | 99.9 | R |
| 63 | 62 | D52 | Return_VFD_1.Torque | Return VFD torque (Nm) | 0 | % | -999.9 | 999.9 | R |
| 64 | 63 | D52 | Return_VFD_1.Power | Return VFD power (Watt) | 0 | % | -999.9 | 999.9 | R |
| 65 | 64 | | Return_Speed_Hz | Return VFD speed (Hz) | 0 | Hz | -99.9 | 99.9 | R |
| 66 | 65 | | Aout_Belimo_1 | Belimo 1 request | 0 | % | 0 | 100 | R |
| 67 | 66 | | Act_Belimo_Position_1 | Belimo 1 position feedback | 0 | % | 0 | 100 | R |
| 68 | 67 | | Aout_Belimo_2 | Belimo 2 request | 0 | % | 0 | 100 | R |
| 69 | 68 | | Act_Belimo_Position_2 | Belimo 2 position feedback | 0 | % | 0 | 100 | R |
| 70 | 69 | | Aout_Belimo_3 | Belimo 3 request | 0 | % | 0 | 100 | R |
| 71 | 70 | | Act_Belimo_Position_3 | Belimo 3 position feedback | 0 | % | 0 | 100 | R |
| 72 | 71 | | Aout_Belimo_4 | Belimo 4 request | 0 | % | 0 | 100 | R |
| 73 | 72 | | Act_Belimo_Position_4 | Belimo 4 position feedback | 0 | % | 0 | 100 | R |
| 74 | 73 | | Aout_Belimo_5 | Belimo 5 request | 0 | % | 0 | 100 | R |
| 75 | 74 | | Act_Belimo_Position_5 | Belimo 5 position feedback | 0 | % | 0 | 100 | R |
| 76 | 75 | | Aout_Belimo_6 | Belimo 6 request | 0 | % | 0 | 100 | R |
| 77 | 76 | | Act_Belimo_Position_6 | Belimo 6 position feedback | 0 | % | 0 | 100 | R |
| 78 | 77 | | Aout_Belimo_7 | Belimo 7 request | 0 | % | 0 | 100 | R |
| 79 | 78 | | Act_Belimo_Position_7 | Belimo 7 position feedback | 0 | % | 0 | 100 | R |
| 80 | 79 | | Aout_Belimo_8 | Belimo 8 request | 0 | % | 0 | 100 | R |
| 81 | 80 | | Act_Belimo_Position_8 | Belimo 8 position feedback | 0 | % | 0 | 100 | R |
| 82 | 81 | | Serial_Temp_1 | Serial probe 1 temperature | 0 | °C | -99.9 | 99.9 | R |
| 83 | 82 | | Serial_Humid_1 | Serial probe 1 humidity | 0 | %rH | 0 | 99.9 | R |
| 84 | 83 | | Serial_Temp_2 | Serial probe 2 temperature | 0 | °C | -99.9 | 99.9 | R |
| 85 | 84 | | Serial_Humid_2 | Serial probe 2 humidity | 0 | %rH | 0 | 99.9 | R |
| 86 | 85 | | Serial_Temp_3 | Serial probe 3 temperature | 0 | °C | -99.9 | 99.9 | R |
| 87 | 86 | | Serial_Humid_3 | Serial probe 3 humidity | 0 | %rH | 0 | 99.9 | R |
| 88 | 87 | | Serial_Temp_4 | Serial probe 4 temperature | 0 | °C | -99.9 | 99.9 | R |

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 89 | 88 | | Serial_Humid_4 | Serial probe 4 humidity | 0 | %rH | 0 | 99.9 | R |
| 90 | 89 | | Serial_Temp_5 | Serial probe 5 temperature | 0 | °C | -99.9 | 99.9 | R |
| 91 | 90 | | Serial_Humid_5 | Serial probe 5 humidity | 0 | %rH | 0 | 99.9 | R |
| 92 | 91 | | Serial_Temp_6 | Serial probe 6 temperature | 0 | °C | -99.9 | 99.9 | R |
| 93 | 92 | | Serial_Humid_6 | Serial probe 6 humidity | 0 | %rH | 0 | 99.9 | R |
| 94 | 93 | B01 | Set_Temperature | Actual temperature set point | 0 | °C | -99.9 | 99.9 | R |
| 95 | 94 | B02 | SCHEDULER.Set_Temp_Comf_S | Comfort temperature set point (summer) | 23 | °C | -99.9 | 99.9 | R / W |
| 96 | 95 | B02 | SCHEDULER.Set_Temp_Comf_W | Comfort temperature set point (winter) | 23 | °C | -99.9 | 99.9 | R / W |
| 97 | 96 | B03 | SCHEDULER.Set_Temp_PreComf_S | Pre-comfort temperature set point (summer) | 25 | °C | -99.9 | 99.9 | R / W |
| 98 | 97 | B03 | SCHEDULER.Set_Temp_PreComf_W | Pre-comfort temperature set point (winter) | 21 | °C | -99.9 | 99.9 | R / W |
| 99 | 98 | B04 | SCHEDULER.Set_Temp_Econ_S | Economy temperature set point (summer) | 27 | °C | -99.9 | 99.9 | R / W |
| 100 | 99 | B04 | SCHEDULER.Set_Temp_Econ_W | Economy temperature set point (winter) | 19 | °C | -99.9 | 99.9 | R / W |
| 101 | 100 | | AI_Probe_Status_1 | Probe 1 alarm status (bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 102 | 101 | | AI_Probe_Status_2 | Probe 2 alarm status (bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 103 | 102 | | AI_Belimo_Prb_FS | Belimo probe and Fire/Smoke alarm status (bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 104 | 103 | | AI_Working_Hours_1 | Operating hour threshold for maintenance request (X1000) | 0 | - | -3276.8 | 3276.7 | R |
| 105 | 104 | | AI_Working_Hours_2 | Operating hour threshold for maintenance request | 0 | - | -3276.8 | 3276.7 | R |
| 106 | 105 | | AI_Serial_Prb | Serial probe alarm status (bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 107 | 106 | Gfc02 | SCHEDULER.Set_T_Lim_Low_S | Minimum temperature set point limit (summer) | 15 | °C | -99.9 | 99.9 | R / W |
| 108 | 107 | Gfc02 | SCHEDULER.Set_T_Lim_Hi_S | Maximum temperature set point limit (summer) | 35 | °C | -99.9 | 99.9 | R / W |
| 109 | 108 | Gfc02 | SCHEDULER.Set_T_Lim_Low_W | Minimum temperature set point limit (winter) | 15 | °C | -99.9 | 99.9 | R / W |
| 110 | 109 | Gfc02 | SCHEDULER.Set_T_Lim_Hi_W | Maximum temperature set point limit (winter) | 35 | °C | -99.9 | 99.9 | R / W |
| 111 | 110 | Gfc05 | TEMP_REG.Diff_Reg_Cool | Differential in cooling | 2 | °C | 0 | 99.9 | R / W |
| 112 | 111 | Gfc05 | TEMP_REG.NZ_Reg_Cool | Neutral zone in cooling | 1 | °C | 0 | 99.9 | R / W |
| 113 | 112 | Gfc06 | TEMP_REG.Diff_Reg_Heat | Differential in heating | 2 | °C | 0 | 99.9 | R / W |
| 114 | 113 | Gfc06 | TEMP_REG.NZ_Reg_Heat | Neutral zone in heating | 1 | °C | 0 | 99.9 | R / W |
| 115 | 114 | Gfc07 | TEMP_REG.Setp_Sum_L_Lim | Min. supply temperature limit (summer) | 8 | °C | -99.9 | 99.9 | R / W |
| 116 | 115 | Gfc07 | TEMP_REG.Setp_Win_L_Lim | Minimum supply temperature limit (winter) | 8 | °C | -99.9 | 99.9 | R / W |
| 117 | 116 | Gfc07 | TEMP_REG.Setp_Sum_H_Lim | Maximum supply temperature limit (summer) | 20 | °C | -99.9 | 99.9 | R / W |
| 118 | 117 | Gfc07 | TEMP_REG.Setp_Win_H_Lim | Maximum supply temperature limit (winter) | 20 | °C | -99.9 | 99.9 | R / W |
| 119 | 118 | Gfc07 | TEMP_REG.Diff_Lim | Differential for supply limit | 2 | °C | 0 | 99.9 | R / W |
| 120 | 119 | Gfc08 | Start_Ext_Temp_Sum | Starting point for compensation in summer | 0 | °C | -99.9 | 99.9 | R / W |
| 121 | 120 | Gfc08 | End_Ext_Temp_Sum | End point for compensation in summer | 0 | °C | -99.9 | 99.9 | R / W |
| 122 | 121 | Gfc08 | Max_Comp_Temp_Sum | Maximum compensation in summer | 0 | °C | -99.9 | 99.9 | R / W |
| 123 | 122 | Gfc09 | Start_Ext_Temp_Win | Starting point for compensation in winter | 0 | °C | -99.9 | 99.9 | R / W |
| 124 | 123 | Gfc09 | End_Ext_Temp_Win | End point for compensation in winter | 0 | °C | -99.9 | 99.9 | R / W |
| 125 | 124 | Gfc09 | Max_Comp_Temp_Win | Maximum compensation in winter | 0 | °C | -99.9 | 99.9 | R / W |
| 126 | 125 | Gfc15 | DAMPERS.Delta_Temp | Activation differential | 0 | °C | 0 | 99.9 | R / W |
| 127 | 126 | Gfc15 | DAMPERS.Diff_Enth | Dampers enthalpy differential | 0 | kJ/kg | 0 | 99.9 | R / W |
| 128 | 127 | Gfc17 | FANS.Supply_Min_Speed | Minimum supply inverter speed | 30 | % | 0 | 100 | R / W |
| 129 | 128 | Gfc17 | FANS.Supply_Max_Speed | Maximum supply inverter speed | 100 | % | 0 | 100 | R / W |
| 130 | 129 | Gfc17 | FANS.Return_Min_Speed | Minimum return inverter speed | 30 | % | 0 | 100 | R / W |
| 131 | 130 | Gfc17 | FANS.Return_Max_Speed | Maximum return Inverter speed | 100 | % | 0 | 100 | R / W |
| 132 | 131 | Gfc25 | PREHEATING.Setp_PreH_Temp | Preheating coil set point | 20 | °C | -99.9 | 99.9 | R / W |
| 133 | 132 | Gfc25 | PREHEATING.Diff_PreH_Temp | Preheating coil differential | 2 | °C | 0 | 99.9 | R / W |
| 134 | 133 | Gfc27 | COOL_HEAT_COIL.Setp_PreH_Temp | Cooling coil set point | 20 | °C | -99.9 | 99.9 | R / W |
| 135 | 134 | Gfc27 | COOL_HEAT_COIL.Diff_PreH_Temp | Cooling coil differential | 2 | °C | 0 | 99.9 | R / W |
| 136 | 135 | Gfc28 | REHEATING.Setp_PostH_Temp_Comp | Supply temperature compensation set point during dehumidify | 20 | °C | -99.9 | 99.9 | R / W |
| 137 | 136 | Gfc28 | REHEATING.Diff_PostH_Temp_Comp | Supply temperature differential during dehumidify | 2 | °C | 0 | 99.9 | R / W |
| 138 | 137 | Gfc31 | Recovery.Delta_Act_Recovery | Heat recovery activation T differential | 0.5 | °C | 0 | 99.9 | R / W |
| 139 | 138 | Gfc31 | Recovery.Diff_Act_Recovery | Heat recovery control T differential | 0.3 | °C | 0 | 99.9 | R / W |
| 140 | 139 | Gfc31 | Recovery.Diff_Enth | Heat recovery control H differential | 5 | kJ/kg | 0 | 99.9 | R / W |
| 141 | 140 | Gfc32 | Recovery.Defrost_Setp | Heat recovery defrost T threshold | -1 | °C | -99.9 | 10 | R / W |
| 142 | 141 | Gfc32 | Recovery.Defrost_Diff | Heat recovery defrost T differential | 4 | °C | 0 | 99.9 | R / W |
| 143 | 142 | Gfc32 | Recovery.Defrost_Heater_Offset | Heat recovery defrost heater offset | 3 | °C | 0 | 99.9 | R / W |
| 144 | 143 | Gfc33 | FROST.Setp_Freeze_Temp | Frost protection T threshold | 3 | °C | 0 | 99.9 | R / W |
| 145 | 144 | Gfc33 | FROST.Diff_Freeze_Temp | Frost protection T differential | 3 | °C | 0 | 99.9 | R / W |
| 146 | 145 | Gfc34 | SCHEDULER.Set_Protection | Room temperature protection threshold | 5 | °C | -99.9 | 99.9 | R / W |
| 147 | 146 | Gfc35 | HUMIDIFIER.Limit_Setp_Low_Temp | Minimum supply temperature limit during adiabatic humidification | 18 | °C | 0 | 99.9 | R / W |
| 148 | 147 | Gfc35 | HUMIDIFIER.Limit_Diff_Low_Temp | Minimum limit differential during adiabatic humidification | 2 | °C | 0 | 99.9 | R / W |
| 149 | 148 | Gfc36 | Reg_Loop_1.Gen_Setpoint | Generic loop 1 set point | 0 | - | -3200 | 3200 | R / W |
| 150 | 149 | Gfc36 | Reg_Loop_1.Gen_Differential | Generic loop 1 differential | 0 | - | -3200 | 3200 | R / W |
| 151 | 150 | Gfc37 | Reg_Loop_2.Gen_Setpoint | Generic loop 2 set point | 0 | - | -3200 | 3200 | R / W |
| 152 | 151 | Gfc37 | Reg_Loop_2.Gen_Differential | Generic loop 2 differential | 0 | - | -3200 | 3200 | R / W |
| 153 | 152 | Gfc38 | Reg_Loop_3.Gen_Setpoint | Generic loop 3 set point | 0 | - | -3200 | 3200 | R / W |
| 154 | 153 | Gfc38 | Reg_Loop_3.Gen_Differential | Generic loop 3 differential | 0 | - | -3200 | 3200 | R / W |
| 155 | 154 | Gfc39 | Reg_Loop_4.Gen_Setpoint | Generic loop 4 set point | 0 | - | -3200 | 3200 | R / W |
| 156 | 155 | Gfc39 | Reg_Loop_4.Gen_Differential | Generic loop 4 differential | 0 | - | -3200 | 3200 | R / W |
| 157 | 156 | | SCHEDULER.S_Thr_Temp_Auto | Temperature threshold for automatic setting in summer mode | 25 | °C | -99.9 | 99.9 | R / W |
| 158 | 157 | | SCHEDULER.W_Thr_Temp_Auto | Temperature threshold for automatic setting in winter mode | 10 | °C | -99.9 | 99.9 | R / W |
| 159 | 158 | | Active_Devices | Device status (Bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 160 | 159 | | Devices_Cfg_1 | Device configuration 1 (Bitfield) | 0 | - | -3276.8 | 3276.7 | R |
| 161 | 160 | | Devices_Cfg_2 | Device configuration 2 (Bitfield) | 0 | - | -3276.8 | 3276.7 | R |

Integer variables

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 210 | 1 | D02 | Supply_Press | Supply air pressure differential | 0 | Pa | -9999 | 9999 | R |
| 211 | 2 | D02 | Return_Press | Return air pressure differential | 0 | Pa | -9999 | 9999 | R |
| 212 | 3 | D03 | Air_Quality_CO2 | Air quality in ppm of CO2 | 0 | ppm | 0 | 9999 | R |
| 213 | 4 | D41 | Supply_VFD_1.Temp_Dissip | Supply VFD heat sink temperature | 0 | °C | -999 | 999 | R |
| 214 | 5 | D41 | Supply_VFD_1.DC_Voltage | Supply inverter DC voltage | 0 | V | 0 | 9999 | R |
| 215 | 6 | | Supply_Speed_rpm | Supply inverter speed (rpm) | 0 | rpm | -9999 | 9999 | R |
| 216 | 7 | D51 | Return_VFD_1.Temp_Dissip | Return VFD heat sink temperature | 0 | °C | -999 | 999 | R |
| 217 | 8 | D51 | Return_VFD_1.DC_Voltage | Return inverter DC voltage | 0 | V | 0 | 9999 | R |
| 218 | 9 | | Return_Speed_rpm | Return inverter speed (rpm) | 0 | rpm | -9999 | 9999 | R |
| 219 | 10 | | BMS_Sw_Ver | Software version | 0 | - | 0 | 32767 | R |
| 220 | 11 | | BMS_Sw_Date | Software date | 0 | - | 0 | 32767 | R |
| 221 | 12 | A01 | SCHEDULER.OnOff_Status | Scheduler ON-OFF status | 1 | - | 0 | | R/W |
| 222 | 13 | B01 | Set_Humidity | Current humidity set point | 0 | %rH | 0 | 100 | R |
| 223 | 14 | B02 | SCHEDULER.Set_Humid_Comf_S | Comfort humidity set point (summer) | 50 | %rH | 0 | 100 | R/W |
| 224 | 15 | B02 | SCHEDULER.Set_Humid_Comf_W | Comfort humidity set point (winter) | 50 | %rH | 0 | 100 | R/W |
| 225 | 16 | B03 | SCHEDULER.Set_Humid_PreComf_S | Pre-comfort humidity set point (summer) | 55 | %rH | 0 | 100 | R/W |
| 226 | 17 | B03 | SCHEDULER.Set_Humid_PreComf_W | Pre-comfort humidity set point (winter) | 45 | %rH | 0 | 100 | R/W |
| 227 | 18 | B04 | SCHEDULER.Set_Humid_Econ_S | Economy humidity set point (summer) | 60 | %rH | 0 | 100 | R/W |
| 228 | 19 | B04 | SCHEDULER.Set_Humid_Econ_W | Economy humidity set point (winter) | 40 | %rH | 0 | 100 | R/W |
| 229 | 20 | | pCO_Hour | Hour from clock on pCO | 0 | h | 0 | 23 | R/W |
| 230 | 21 | | pCO_Minute | Minutes from clock on pCO | 0 | min | 0 | 59 | R/W |
| 231 | 22 | | pCO_Day | Day from clock on pCO | 0 | day | 1 | 31 | R/W |
| 232 | 23 | | pCO_Month | Month from clock on pCO | 0 | month | 1 | 12 | R/W |
| 233 | 24 | | pCO_Year | Year from clock on pCO | 0 | year | 0 | 99 | R/W |
| 234 | 25 | C02 | SCHEDULER.Day_Scheduler_Setting | Select day from Scheduler | 0 | day | 0 | 6 | R/W |
| 235 | 26 | C02 | SCHEDULER.F1_Start_Hour | Start hours band F1 | 0 | hour | 0 | 24 | R/W |
| 236 | 27 | C02 | SCHEDULER.F1_Start_Minute | Start minutes band F1 | 0 | min | 0 | 59 | R/W |
| 237 | 28 | C02 | SCHEDULER.F1_Set_Type | Type of set point band F1 | 0 | - | 0 | 3 | R/W |
| 238 | 29 | C02 | SCHEDULER.F2_Start_Hour | Start hours band F2 | 0 | hour | 0 | 24 | R/W |
| 239 | 30 | C02 | SCHEDULER.F2_Start_Minute | Start minutes band F2 | 0 | min | 0 | 59 | R/W |
| 240 | 31 | C02 | SCHEDULER.F2_Set_Type | Type of set point band F2 | 0 | - | 0 | 3 | R/W |
| 241 | 32 | C02 | SCHEDULER.F3_Start_Hour | Start hours band F3 | 0 | hour | 0 | 24 | R/W |
| 242 | 33 | C02 | SCHEDULER.F3_Start_Minute | Start minutes band F3 | 0 | min | 0 | 59 | R/W |
| 243 | 34 | C02 | SCHEDULER.F3_Set_Type | Type of set point band F3 | 0 | - | 0 | 3 | R/W |
| 244 | 35 | C02 | SCHEDULER.F4_Start_Hour | Start hours band F4 | 0 | hour | 0 | 24 | R/W |
| 245 | 36 | C02 | SCHEDULER.F4_Start_Minute | Start minutes band F4 | 0 | min | 0 | 59 | R/W |
| 246 | 37 | C02 | SCHEDULER.F4_Set_Type | Type of set point band F4 | 0 | - | 0 | 3 | R/W |
| 247 | 38 | C03 | SCHEDULER.P1_Start_Day | Start day period 1 | 0 | day | 0 | 31 | R/W |
| 248 | 39 | CO3 | SCHEDULER.P1_Start_Month | Start month period 1 | 0 | month | 0 | 12 | R/W |
| 249 | 40 | C03 | SCHEDULER.P1_Stop_Day | End day period 1 | 0 | day | 0 | 31 | R/W |
| 250 | 41 | C03 | SCHEDULER.P1_Stop_Month | End month period 1 | 0 | month | 0 | 12 | R/W |
| 251 | 42 | CO3 | SCHEDULER.P1_Set_Type | Type of set point period 1 | 4 | - | 0 | 4 | R/W |
| 252 | 43 | C03 | SCHEDULER.P2_Start_Day | Start day period 2 | 0 | day | 0 | 31 | R/W |
| 253 | 44 | C03 | SCHEDULER.P2_Start_Month | Start month period 2 | 0 | month | 0 | 12 | R/W |
| 254 | 45 | CO3 | SCHEDULER.P2_Stop_Day | End day period 2 | 0 | day | 0 | 31 | R/W |
| 255 | 46 | C03 | SCHEDULER.P2_Stop_Month | End month period 2 | 0 | month | 0 | 12 | R/W |
| 256 | 47 | C03 | SCHEDULER.P2_Set_Type | Type of set point period 2 | 4 | - | 0 | 4 | R/W |
| 257 | 48 | CO3 | SCHEDULER.P3_Start_Day | Start day period 3 | 0 | day | 0 | 31 | R/W |
| 258 | 49 | C03 | SCHEDULER.P3_Start_Month | Start month period 3 | 0 | month | 0 | 12 | R/W |
| 259 | 50 | C03 | SCHEDULER.P3_Stop_Day | End day period 3 | 0 | day | 0 | 31 | R/W |
| 260 | 51 | CO3 | SCHEDULER.P3_Stop_Month | End month period 3 | 0 | month | 0 | 12 | R/W |
| 261 | 52 | C03 | SCHEDULER.P3_Set_Type | Type of set point period 3 | 4 | - | 0 | 4 | R/W |
| 262 | 53 | C04 | SCHEDULER.SD1_Day | Day for special day 1 | 0 | day | 0 | 31 | R/W |
| 263 | 54 | C04 | SCHEDULER.SD1_Month | Month for special day 1 | 0 | month | 0 | 12 | R/W |
| 264 | 55 | C04 | SCHEDULER.SD1_Set_Type | Type of set point special day 1 | 5 | - | 0 | 5 | R/W |
| 265 | 56 | C04 | SCHEDULER.SD2_Day | Day for special day 2 | 0 | day | 0 | 31 | R/W |
| 266 | 57 | C04 | SCHEDULER.SD2_Month | Month for special day 2 | 0 | month | 0 | 12 | R/W |
| 267 | 58 | C04 | SCHEDULER.SD2_Set_Type | Type of set point special day 2 | 5 | - | 0 | 5 | R/W |
| 268 | 59 | C04 | SCHEDULER.SD3_Day | Day for special day 3 | 0 | day | 0 | 31 | R/W |
| 269 | 60 | C04 | SCHEDULER.SD3_Month | Month for special day 3 | 0 | month | 0 | 12 | R/W |
| 270 | 61 | C04 | SCHEDULER.SD3_Set_Type | Type of set point special day 3 | 5 | - | 0 | 5 | R/W |
| 271 | 62 | C04 | SCHEDULER.SD4_Day | Day for special day 4 | 0 | day | 0 | 31 | R/W |
| 272 | 63 | C04 | SCHEDULER.SD4_Month | Month for special day 4 | 0 | month | 0 | 12 | R/W |
| 273 | 64 | C04 | SCHEDULER.SD4_Set_Type | Type of set point special day 4 | 5 | - | 0 | 5 | R/W |
| 274 | 65 | C04 | SCHEDULER.SD5_Day | Day for special day 5 | 0 | day | 0 | 31 | R/W |
| 275 | 66 | C04 | SCHEDULER.SD5_Month | Month for special day 5 | 0 | month | 0 | 12 | R/W |
| 276 | 67 | C04 | SCHEDULER.SD5_Set_Type | Type of set point special day 5 | 5 | - | 0 | 5 | R/W |
| 277 | 68 | C04 | SCHEDULER.SD6_Day | Day for special day 6 | 0 | day | 0 | 31 | R/W |
| 278 | 69 | C04 | SCHEDULER.SD6_Month | Month for special day 6 | 0 | month | 0 | 12 | R/W |
| 279 | 70 | C04 | SCHEDULER.SD6_Set_Type | Type of set point special day 6 | 5 | - | 0 | 5 | R/W |
| 280 | 71 | Gfc03 | SCHEDULER.Set_H_Lim_Low_S | Minimum humidity set point limit (summer) | 30 | %rH | 0 | 100 | R/W |
| 281 | 72 | Gfc03 | SCHEDULER.Set_H_Lim_Hi_S | Maximum humidity set point limit (summer) | 90 | %rH | 0 | 100 | R/W |
| 282 | 73 | Gfc03 | SCHEDULER.Set_H_Lim_Low_W | Minimum humidity set point limit (winter) | 30 | %rH | 0 | 100 | R/W |
| 283 | 74 | Gfc03 | SCHEDULER.Set_H_Lim_Hi_W | Maximum humidity set point limit (winter) | 90 | %rH | 0 | 100 | R/W |
| 284 | 75 | Gfc04 | TEMP_REG.Regulation_Type | Type of temperature control (P-PI-PID) | 0 | - | 0 | 2 | R/W |
| 285 | 76 | Gfc04 | TEMP_REG.Limit_Type | Type of temperature limit control | 1 | - | 1 | 4 | R/W |
| 286 | 77 | Gfc05 | TEMP_REG.Int_Time_Cool | Integral time in cooling | 0 | s | 0 | 999 | R/W |
| 287 | 78 | Gfc05 | TEMP_REG.Der_Time_Cool | Derivative time in cooling | 300 | s | 0 | 999 | R/W |
| 288 | 79 | Gfc06 | TEMP_REG.Int_Time_Heat | Integral time in heating | 300 | s | 0 | 999 | R/W |
| 289 | 80 | Gfc06 | TEMP_REG.Der_Time_Heat | Derivative time in heating | 300 | s | 0 | 999 | R/W |
| 290 | 81 | Gfc07 | TEMP_REG.Int_Limit_Time | Integral time for supply limit | 300 | s | 0 | 999 | R/W |
| 291 | 82 | Gfc08 | Comp_Sum_Type | Type of compensation in summer | 0 | - | 0 | 3 | R/W |
| 292 | 83 | Gfc09 | Comp_Win_Type | Type of compensation in winter | 0- | - | 0 | 3 | R/W |
| 293 | 84 | Gfc10 | HUMID_REG.Regulation_Type | Type of humidity control (P-PI-PID) | 0 | - | 0 | 2 | R/W |
| 294 | 85 | Gfc10 | HUMID_REG.Limit_Type | Type of humidity limit control | 1 | - | 1 | 4 | R/W |
| 295 | 86 | Gfc11 | HUMID_REG.Diff_Reg_Dehum | Dehumidification differential | 5 | %rH | 0 | 100 | R/W |
| 296 | 87 | Gfc11 | HUMID_REG.NZ_Reg_Dehum | Dehumidification neutral zone | 2 | %rH | 0 | 100 | R/W |
| 297 | 88 | Gfc11 | HUMID_REG.Int_Time_Dehum | Dehumidification integral time | 30 | s | 0 | 999 | R/W |

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 298 | 89 | Gfc11 | HUMID_REG.Der_Time_Dehum | Dehumidification derivative time | 0 | s | 0 | 999 | R / W |
| 299 | 90 | Gfc12 | HUMID_REG.Diff_Reg_Humid | Humidification differential | 4 | %rH | 0 | 100 | R / W |
| 300 | 91 | Gfc12 | HUMID_REG.NZ_Reg_Humid | Humidification neutral zone | 2 | %rH | 0 | 100 | R / W |
| 301 | 92 | Gfc12 | HUMID_REG.Int_Time_Humid | Humidification integral time | 30 | s | 0 | 999 | R / W |
| 302 | 93 | Gfc12 | HUMID_REG.Der_Time_Humid | Humidification derivative time | 0 | s | 0 | 999 | R / W |
| 303 | 94 | Gfc13 | HUMID_REG.Setp_L_Lim | Minimum supply humidity limit | 0 | %rH | 0 | 100 | R / W |
| 304 | 95 | Gfc13 | HUMID_REG.Setp_H_Lim | Maximum supply humidity limit | 100 | %rH | 0 | 100 | R / W |
| 305 | 96 | Gfc13 | HUMID_REG.Diff_Lim | Differential for humidity limit | 5 | %rH | 0 | 100 | R / W |
| 306 | 97 | Gfc13 | HUMID_REG.Int_Limit_Time | Integral time for humidity limit | 300 | s | 0 | 999 | R / W |
| 307 | 98 | Gfc16 | P_Atm | Atmospheric pressure (mbar) for enthalpy calculation | 1000 | mbar | 600 | 1100 | R / W |
| 308 | 99 | Gfc18 | FANS.Setp_Press_Sup | Supply pressure setpoint | 500 | Pa | 0 | 2000 | R / W |
| 309 | 100 | Gfc18 | FANS.Diff_Press_Sup | Supply pressure differential setpoint | 200 | Pa | 0 | 1000 | R / W |
| 310 | 101 | Gfc18 | FANS.Supply_Int_Time | Supply fan control integral time | 300 | s | 0 | 9999 | R / W |
| 311 | 102 | Gfc18 | FANS.Supply_Der_Time | Supply fan control derivative time | 0 | s | 0 | 9999 | R / W |
| 312 | 103 | Gfc19 | FANS.Setp_Press_Ret | Return pressure setpoint | 500 | Pa | 0 | 2000 | R / W |
| 313 | 104 | Gfc19 | FANS.Diff_Press_Ret | Return pressure differential setpoint | 200 | Pa | 0 | 1000 | R / W |
| 314 | 105 | Gfc19 | FANS.Return_Int_Time | Return fan control integral time | 300 | s | 0 | 9999 | R / W |
| 315 | 106 | Gfc19 | FANS.Return_Der_Time | Return fan control derivative time | 0 | s | 0 | 9999 | R / W |
| 316 | 107 | Gfc20 | Cascade.Thr_End_FreeC_Cool | Freecooling control end point in Cascade (% Differential) | 50 | % | 0 | 100 | R / W |
| 317 | 108 | Gfc20 | Cascade.Thr_Start_FreeC_Cool | Cooling coil control starting point in Cascade (% Differential) | 50 | % | 0 | 100 | R / W |
| 318 | 109 | Gfc20 | Cascade.Thr_End_Rec_Cool | Heat recovery control end point in Cascade (% Differential) | 40 | % | 0 | 100 | R / W |
| 319 | 110 | Gfc20 | Cascade.Thr_Start_Rec_Cool | Cooling coil control starting point in Cascade with heat recovery | 40 | % | 0 | 100 | R / W |
| 320 | 111 | Gfc21 | Cascade.Thr_End_FreeC_Heat | Freeheating control end point in Cascade (% Differential) | 50 | % | 0 | 100 | R / W |
| 321 | 112 | Gfc21 | Cascade.Thr_Start_FreeC_Heat | Freeheating control starting point in Cascade (% Differential) | 50 | % | 0 | 100 | R / W |
| 322 | 113 | Gfc21, Gfc22 | Cascade.Thr_End_Heat_PostHeat | Heating coil control end point | 100 | % | 0 | 100 | R / W |
| 323 | 114 | Gfc21 | Cascade.Thr_End_Rec_Heat | Heat recovery control end point | 40 | % | 0 | 100 | R / W |
| 324 | 115 | Gfc21 | Cascade.Thr_Start_Rec_Heat | Heating coil control starting point | 40 | % | 0 | 100 | R / W |
| 325 | 116 | Gfc22 | Cascade.Thr_Start_Heat_PostHeat | Reheating coil control starting point | 80 | % | 0 | 100 | R / W |
| 326 | 117 | Gfc23 | COOLING.CutOff_Cool | Cooling valve cut-off in cooling | 0 | % | 0 | 100 | R / W |
| 327 | 118 | Gfc23 | COOLING.CutOff_Dehum | Cooling valve cut-off in dehumidify | 0 | % | 0 | 100 | R / W |
| 328 | 119 | Gfc24 | PREHEATING.CutOff_PreH | Preheating valve cut-off | 0 | % | 0 | 100 | R / W |
| 329 | 120 | Gfc29 | REHEATING.CutOff_PostH | Reheating valve cut-off | 0 | % | 0 | 100 | R / W |
| 330 | 121 | Gfc26 | COOL_HEAT_COIL.CutOff_Cool | Cool/heat valve cut-off in cooling. | 0 | % | 0 | 100 | R / W |
| 331 | 122 | Gfc26 | COOL_HEAT_COIL.CutOff_Dehum | Cool/heat valve cut-off in dehumidify | 0 | % | 0 | 100 | R / W |
| 332 | 123 | Gfc26 | COOL_HEAT_COIL.CutOff_Heat | Cool/heat valve cut-off in heating. | 0 | % | 0 | 100 | R / W |
| 333 | 124 | Gfc30 | AIR_QUALITY.Setp_Reg_CO2 | Air quality set point in ppm of CO2 | 1200 | ppm | 0 | 5000 | R / W |
| 334 | 125 | Gfc30 | AIR_QUALITY.Setp_Reg_VOC | Air quality set point in % of VOC | 50 | % | 0 | 100 | R / W |
| 335 | 126 | Gfc30 | AIR_QUALITY.Diff_Reg_CO2 | Air quality differential in ppm of CO2 | 200 | ppm | 0 | 2000 | R / W |
| 336 | 127 | Gfc30 | AIR_QUALITY.Diff_Reg_VOC | Air quality differential in % of VOC | 10 | % | 0 | 100 | R / W |
| 337 | 128 | Gfc32 | Recovery.Defrost_Speed | Heat wheel speed in defrost | 100 | rpm | 0 | 100 | R / W |
| 338 | 129 | Gfc36 | Reg_Loop_1.Gen_Reg_Int_Time | Generic loop 1 integral time | 0 | s | 0 | 999 | R / W |
| 339 | 130 | Gfc37 | Reg_Loop_2.Gen_Reg_Int_Time | Generic loop 2 integral time | 0 | s | 0 | 999 | R / W |
| 340 | 131 | Gfc38 | Reg_Loop_3.Gen_Reg_Int_Time | Generic loop 3 integral time | 0 | s | 0 | 999 | R / W |
| 341 | 132 | Gfc39 | Reg_Loop_4.Gen_Reg_Int_Time | Generic loop 4 integral time | 0 | s | 0 | 999 | R / W |
| 342 | 133 | | SCHEDULER.Season_Sel_From | Select season from BMS/ID | 0 | - | 0 | 4 | R / W |
| 343 | 134 | | SCHEDULER.S_Start_Day | Summer start day | 15 | day | 1 | 31 | R / W |
| 344 | 135 | | SCHEDULER.S_Start_Month | Summer start month | 5 | month | 1 | 12 | R / W |
| 345 | 136 | | SCHEDULER.W_Start_Day | Winter start day | 30 | day | 1 | 31 | R / W |
| 346 | 137 | | SCHEDULER.W_Start_Month | Winter start month | 9 | month | 1 | 12 | R / W |
| 347 | 138 | | SCHEDULER.S_W_Delay_Auto_Change | Summer/Winter season changeover delay | 1 | hour | 0 | 999 | R / W |
| 348 | 139 | | Force_Supply_Fan | Force supply fan (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 349 | 140 | | Force_Return_Fan | Force return fan (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 350 | 141 | | Force_Cooling | Force cooling coil(0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 351 | 142 | | Force_PreHeating | Force preheating coil (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 352 | 143 | | Force_PostHeating | Force reheating coil (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 353 | 144 | | Force_Heat_Cool | Force heating/cooling coil (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 354 | 145 | | Force_Humidifier | Force humidifier (0=Auto, 1=000%...101=100%) | 0 | % | 0 | 101 | R / W |
| 355 | 146 | | Hour_Supply_Fan_1 | Supply fan 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 356 | 147 | | Hour_L_Supply_Fan_1 | Supply fan 1 operating hours | 0 | hour | 0 | 999 | R |
| 357 | 148 | | Hour_Supply_Fan_2 | Supply fan 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 358 | 149 | | Hour_L_Supply_Fan_2 | Supply fan 2 operating hours | 0 | hour | 0 | 999 | R |
| 359 | 150 | | Hour_Return_Fan_1 | Return fan 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 360 | 151 | | Hour_L_Return_Fan_1 | Return fan 1 operating hours | 0 | hour | 0 | 999 | R |
| 361 | 152 | | Hour_Return_Fan_2 | Return fan 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 362 | 153 | | Hour_L_Return_Fan_2 | Return fan 2 operating hours | 0 | hour | 0 | 999 | R |
| 363 | 154 | | Hour_Humidifier | Humidifier operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 364 | 155 | | Hour_L_Humidifier | Humidifier operating hours | 0 | hour | 0 | 999 | R |
| 365 | 156 | | Hour_Rotary_Recovery | Heat wheel operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 366 | 157 | | Hour_L_Rotary_Recovery | Heat wheel operating hours | 0 | hour | 0 | 999 | R |
| 367 | 158 | | Hour_Cool_Pump_1 | Cooling coil pump 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 368 | 159 | | Hour_L_Cool_Pump_1 | Cooling coil pump 1 operating hours | 0 | hour | 0 | 999 | R |
| 369 | 160 | | Hour_Cool_Pump_2 | Cooling coil pump 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 370 | 161 | | Hour_L_Cool_Pump_2 | Cooling coil pump 2 operating hours | 0 | hour | 0 | 999 | R |
| 371 | 162 | | Hour_PreH_Pump_1 | Preheating coil pump 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 372 | 163 | | Hour_L_PreH_Pump_1 | Preheating coil pump 1 operating hours | 0 | hour | 0 | 999 | R |

| Modbus ADDR | Carel ADDR. | Mask Index | Commissioning Tool variable name | Extended description | Def | UOM | Min | Max | R/W |
|---|---|---|---|---|---|---|---|---|---|
| 373 | 164 | | Hour_PreH_Pump_2 | Preheating coil pump 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 374 | 165 | | Hour_L_PreH_Pump_2 | Preheating coil pump 2 operating hours | 0 | hour | 0 | 999 | R |
| 375 | 166 | | Hour_PostH_Pump_1 | Reheating coil pump 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 376 | 167 | | Hour_L_PostH_Pump_1 | Reheating coil pump 1 operating hours | 0 | hour | 0 | 999 | R |
| 377 | 168 | | Hour_PostH_Pump_2 | Reheating coil pump 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 378 | 169 | | Hour_L_PostH_Pump_2 | Reheating coil pump 2 operating hours | 0 | hour | 0 | 999 | R |
| 379 | 170 | | Hour_Heaters_Pre_1 | Preheating heater 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 380 | 171 | | Hour_L_Heaters_Pre_1 | Preheating heater 1 operating hours | 0 | hour | 0 | 999 | R |
| 381 | 172 | | Hour_Heaters_Pre_2 | Preheating heater 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 382 | 173 | | Hour_L_Heaters_Pre_2 | Preheating heater 2 operating hours | 0 | hour | 0 | 999 | R |
| 383 | 174 | | Hour_Heaters_Pre_3 | Preheating heater 3 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 384 | 175 | | Hour_L_Heaters_Pre_3 | Preheating heater 3 operating hours | 0 | hour | 0 | 999 | R |
| 385 | 176 | | Hour_Heaters_Pre_4 | Preheating heater 4operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 386 | 177 | | Hour_L_Heaters_Pre_4 | Preheating heater 4 operating hours | 0 | hour | 0 | 999 | R |
| 387 | 178 | | Hour_Heaters_Post_1 | Reheating heater 1 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 388 | 179 | | Hour_L_Heaters_Post_1 | Reheating heater 1 operating hours | 0 | hour | 0 | 999 | R |
| 389 | 180 | | Hour_Heaters_Post_2 | Reheating heater 2 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 390 | 181 | | Hour_L_Heaters_Post_2 | Reheating heater 2 operating hours | 0 | hour | 0 | 999 | R |
| 391 | 182 | | Hour_Heaters_Post_3 | Reheating heater 3 operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 392 | 183 | | Hour_L_Heaters_Post_3 | Reheating heater 3 operating hours | 0 | hour | 0 | 999 | R |
| 393 | 184 | | Hour_Heaters_Post_4 | Reheating heater 4operating hours (X1000) - thousands | 0 | - | 0 | 999 | R |
| 394 | 185 | | Hour_L_Heaters_Post_4 | Reheating heater 4 operating hours | 0 | hour | 0 | 999 | R |
| 395 | 186 | | Unit_Status | Unit status | 0 | - | 0 | 17 | R / W |
| 397 | 188 | | Force_Cooling_Ana | | 0 | - | 0 | 100 | R / W |
| 398 | 189 | | Force_PreHeating_Ana | | 0 | - | 0 | 100 | R / W |
| 399 | 190 | | Force_PostHeating_Ana | | 0 | - | 0 | 100 | R / W |
| 400 | 191 | | Force_Humid_Reg_Req_Ana | | 0 | - | 0 | 100 | R / W |

Tab. 9.c

# 10. ALARMS

## 10.1 Types of alarms

For configuration of the alarms see paragraph 6.1.1.
Input alarms: generic (shuts down the unit), serious (stops the unit immediately). Output alarms: general (minor+serious), minor (see table of alarms), serious (see table of alarms) and filters (supply 1 +supply 2 +return +filters). There are three types of alarms:

- with manual reset;
- with automatic reset: the alarm is resets and the unit restarts automatically when the alarm condition has been resolved;
- with semiautomatic reset: reset is automatic but the alarm signal remains active.

When an alarm occurs, the bell button flashes with a red light and the buzzer sounds. To mute the buzzer, press the bell button, while to reset the alarms press and hold the bell button for 3 s.

## 10.2 Alarm log

The 50 most recent alarms are saved in a FIFO alarm log. The last alarm activated is added to the bottom of the alarm log. To access the log, from the standard display:
Alarm button ➔Enter➔Alarm log
The screen displays the alarm code, description and readings of the supply and return probes at the moment the alarm was activated.


Fig. 10.a

Key

| | | | |
|---|---|---|---|
| 1 | Supply probe | 2 | Return probe |

## 10.3 Alarm table

| Code | Description | Type of reset | Effect on control | Serious alarm (G)/ Minor (L) |
|---|---|---|---|---|
| A01 | Supply temperature probe | Automatic | Stop temperature limit function, stop reheating if Sreg=return | Serious |
| A02 | Return temperature probe | Automatic | Stop set point compensation function and heat recovery | Serious |
| A03 | Outside temperature sensor | Automatic | Stop set point compensation function and heat recovery | Minor |
| A04 | Humidity probe supply | Automatic | Stop humidity limit function | Serious |
| A05 | Return humidity probe | Automatic | Stop heat recovery by enthalpy, freecooling by enthalpy, if return probe= Sreg ⊠ stop unit | Serious |
| A06 | Outside humidity probe | Automatic | Stop freecooling/ freeheating and heat recovery by enthalpy functions | Minor |
| A07 | Supply pressure probe | Automatic | Stop individual fan or unit as per parameter Ha04 | Serious |
| A08 | Return pressure probe fault | Automatic | Stop individual fan or unit as per parameter Ha04 | Serious |
| A09 | Frost protection temperature probe | Automatic | Shutdown unit | Serious |
| A10 | Saturated temperature probe | Automatic | | Minor |
| A11 | Air quality probe (CO2) | Automatic | Fan at MAX and outside damper open at MAX | Minor |
| A12 | Air quality probe (VOC) | Automatic | Fan at MAX and outside damper open at MAX | Minor |
| A13 | Exhaust temperature probe | Automatic | Stop heat recovery function if frost protection control on exhaust probe | Minor |
| A14 | Cooling or heat/cool coil temperature probe | Automatic | Deactivate coil | Minor |
| A15 | Preheating coil temperature probe fault | Automatic | Deactivate coil | Minor |
| A16 | Reheating coil temperature probe fault | Automatic | Deactivate coil | Minor |
| A17 | Auxiliary probe 1 | Automatic | Stop auxiliary control loop 1 | Minor |
| A18 | Auxiliary probe 2 | Automatic | Stop auxiliary control loop 2 | Minor |
| A19 | Auxiliary probe 3 | Automatic | Stop auxiliary control loop 3 | Minor |
| A20 | Auxiliary probe 4 | Automatic | Stop auxiliary control loop 4 | Minor |
| A21 | Room temperature probe fault | Automatic | Stop room protection | Minor |
| A22 | Room humidity probe | Automatic | | Minor |
| A23 | Analogue input probe offset | Automatic | Eliminate offset | Minor |
| A24 | Control probe fault | Automatic | Shutdown unit | Serious |
| B01 | Dirty heat recovery unit alarm | Automatic | Stop heat recovery function | Minor |
| B02 | Reheating heaters thermal overload alarm | Manual | Shutdown unit | Serious |
| B03 | Preheating heaters thermal overload alarm | Manual | Shutdown unit | Serious |
| B04 | Cooling coil inlet limit alarm | Automatic | Deactivate coil (after 10 min) | Serious |
| B05 | Preheat coil inlet limit alarm | Automatic | Deactivate coil (after 10 min) | Serious |
| B06 | Reheat coil inlet limit alarm | Automatic | Deactivate coil (after 10 min) | Serious |
| B07 | Heat / cool coil inlet limit alarm | Automatic | Deactivate coil (after 10 min) | Serious |
| E11 | pCOe 1 offline | Semiautomatic | Shutdown unit | Serious |
| E12 | Incorrect probe 1, 2 configuration on pCOe 1 | Automatic | Immediately stop unit | Serious |
| E13 | Incorrect probe 3, 4 configuration on pCOe 1 | Automatic | Immediately stop unit | Serious |
| E21 | pCOe 2 offline | Semiautomatic | Shutdown unit | Serious |

| Code | Description | Type of reset | Effect on control | | Serious alarm (G)/ Minor (L) |
|---|---|---|---|---|---|
| E22 | Incorrect probe 1, 2 configuration on pCOe 2 | Automatic | Immediately stop unit | | Serious |
| E23 | Incorrect probe 3, 4 configuration on pCOe 2 | Automatic | Immediately stop unit | | Serious |
| F01 | Supply 1 flow alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop supply fan and control devices | |
| F02 | Return 1 flow alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop return fan | |
| F03 | Supply 2 flow alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop supply fan and control devices | |
| F04 | Return 2 flow alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop return fan | |
| F05 | Supply fan 1 overload | Manual | Stop all control devices on supply | | |
| F06 | Return fan 1 overload | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop return fan | |
| F07 | Supply inverter alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop supply fan and control devices | |
| F08 | Return inverter alarm | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop return fan | |
| F09 | Supply fan 2 overload | Manual | Stop all control devices on supply | | |
| F10 | Return fan 2 overload | Manual | **Ha04** | **effect** | Serious |
| | | | global | total shutdown | |
| | | | individual | stop return fan | |
| F11 | Supply 1 flow warning | Automatic | Perform number of attempts set on Hc07 | | Minor |
| F12 | Supply 2 flow warning | Automatic | Perform number of attempts set on Hc07 | | Minor |
| F13 | Return 1 flow warning | Automatic | Perform number of attempts set on Hc07 | | Minor |
| F14 | Return 2 flow warning | Automatic | Perform number of attempts set on Hc07 | | Minor |
| G01 | Clock fault | Manual | Stop time bands, maintains last operating mode | | Minor |
| G02 | Extended memory fault | Manual | Deactivate load default parameters Ha96 | | Minor |
| G03 | Frost protection alarm AIN | Automatic | Stop fans, close dampers, activate preheating coil at 100%, and cooling coil at 50%, all pumps on | | Minor |
| G04 | Frost protection alarm DIN | Automatic | | | Minor |
| G05 | Low room temperature protection | Automatic | Control operates as if it were ON | | Minor |
| H01 | Humidifier alarm | Manual | Stop humidification function | | Serious |
| M11 | Belimo 1 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M12 | Belimo 1 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M13 | Belimo 1 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M21 | Belimo 2 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M22 | Belimo 2 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M23 | Belimo 2 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M31 | Belimo 3 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M32 | Belimo 3 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M33 | Belimo 3 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M41 | Belimo 4 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M42 | Belimo 4 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M43 | Belimo 4 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M51 | Belimo 5 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M52 | Belimo 5 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M53 | Belimo 5 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M61 | Belimo 6 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M62 | Belimo 6 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M63 | Belimo 6 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M71 | Belimo 7 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M72 | Belimo 7 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M73 | Belimo 7 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| M81 | Belimo 8 Offline | Semiautomatic | Immediately stop unit | | Serious |
| M82 | Belimo 8 probe fault | Semiautomatic | Depends on probe function | | Minor |
| M83 | Belimo 8 Fire/Smoke | Manual | Immediately stop unit | | Serious |
| O01 | BMS offline alarm | Automatic | Replace BMS probes with backup probes | | Serious |
| P01 | Cooling pump 1 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P02 | Cooling pump 2 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P03 | Cooling pump 1 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P04 | Cooling pump 2 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P05 | Cooling pump 1 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| P06 | Cooling pump 2 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| P07 | Preheating pump 1 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P08 | Preheating pump 2 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P09 | Preheating pump 1 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P10 | Preheating pump 2 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P11 | Preheating pump 1 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| P12 | Preheating pump 2 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| P13 | Reheating pump 1 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P14 | Reheating pump 2 flow warning | Automatic | Perform number of attempts set on Ha10 | | Minor |
| P15 | Reheating pump 1 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P16 | Reheating pump 2 flow alarm | Manual | Depends on the no. of pumps | | Serious |
| P17 | Reheating pump 1 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| P18 | Reheating pump 2 thermal overload alarm | Manual | Depends on the no. of pumps | | Serious |
| S11 | Serial humidity probe 1 fault | Semiautomatic | | | Minor |
| S12 | Serial probe 1 offline | Semiautomatic | | | Minor |
| S13 | Serial temperature probe 1 fault | Semiautomatic | | | Minor |
| S21 | Serial humidity probe 2 fault | Semiautomatic | | | Minor |
| S22 | Serial probe 2 offline | Semiautomatic | | | Minor |
| S23 | Serial temperature probe 2 fault | Semiautomatic | | | Minor |
| S31 | Serial humidity probe 3 fault | Semiautomatic | | | Minor |

| Code | Description | Type of reset | Effect on control | Serious alarm (G)/ Minor (L) |
|---|---|---|---|---|
| S32 | Serial probe 3 offline | Semiautomatic | | Minor |
| S33 | Serial temperature probe 3 fault | Semiautomatic | | Minor |
| S41 | Serial humidity probe 4 fault | Semiautomatic | | Minor |
| S42 | Serial probe 4 offline | Semiautomatic | | Minor |
| S43 | Serial temperature probe 4 fault | Semiautomatic | | Minor |
| S51 | Serial humidity probe 5 fault | Semiautomatic | | Minor |
| S52 | Serial probe 5 offline | Semiautomatic | | Minor |
| S53 | Serial temperature probe 5 fault | Semiautomatic | | Minor |
| S61 | Serial humidity probe 6 fault | Semiautomatic | | Minor |
| S62 | Serial probe 6 offline | Semiautomatic | | Minor |
| S63 | Serial temperature probe 6 fault | Semiautomatic | | Minor |
| T01 | Humidifier maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T02 | Supply fan 1 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T03 | Return fan 1 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T04 | Cooling pump 1 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T05 | Cooling pump 2 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T06 | Preheating pump 1 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T07 | Preheating pump 2 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T08 | Preheating pump 1 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T09 | Preheating pump 2 maintenance warning | Manual | Reset service hours (Gf*) | Minor |
| T10 | Reheat heater 1 warning | Manual | Reset service hours (Gf*) | Minor |
| T11 | Reheat heater 2 warning | Manual | Reset service hours (Gf*) | Minor |
| T12 | Reheat heater 3 warning | Manual | Reset service hours (Gf*) | Minor |
| T13 | Heat wheel warning | Manual | Reset service hours (Gf*) | Minor |
| T14 | Warning supply fan 2 maintenance | Manual | Reset service hours (Gf*) | Minor |
| T15 | Warning return fan 2 maintenance | Manual | Reset service hours (Gf*) | Minor |
| T16 | Reheat heater 4 warning | Manual | Reset service hours (Gf*) | Minor |
| T17 | Preheat heater 1 warning | Manual | Reset service hours (Gf*) | Minor |
| T18 | Preheat heater 2 warning | Manual | Reset service hours (Gf*) | Minor |
| T19 | Preheat heater 3 warning | Manual | Reset service hours (Gf*) | Minor |
| T20 | Preheat heater 4 warning | Manual | Reset service hours (Gf*) | Minor |
| U01 | Generic alarm from digital input | Automatic | Stop unit | Minor |
| U02 | Serious alarm from digital input | Manual | Stop unit | Serious |
| U03 | Supply filter 1 alarm | Automatic | | Minor |
| U04 | Supply filter 2 alarm | Automatic | | Minor |
| U05 | Return filter alarm | Automatic | | Minor |
| U06 | Smoke/fire alarm | Manual | Immediately stop unit | Serious |
| U07 | Open door alarm | Manual | Immediately stop unit | Serious |
| U08 | Dirty filter alarm | Automatic | | Minor |
| V11 | Supply VFD offline | Semiautomatic | Immediately stop unit | Serious |
| V12 | Supply VFD alarms 1-2-3-5 | Semiautomatic | | Serious/Minor |
| V13 | Supply VFD alarms 9-11-13-14-15 | Semiautomatic | Ha04 / effect | Serious/Minor |
| V14 | Supply VFD alarms 16-17-22-25-29 | Semiautomatic | global / total shutdown | Serious/Minor |
| V15 | Supply VFD alarms 34-40-41-50-51 | Semiautomatic | individual / stop supply fan and control devices | Serious/Minor |
| V16 | Supply VFD alarms 52-53-54-55 | Semiautomatic | | Serious/Minor |
| V21 | Return VFD offline | Semiautomatic | Immediately stop unit | Serious |
| V22 | Return VFD alarms 1-2-3-5 | Semiautomatic | | Serious/Minor |
| V23 | Return VFD alarms 9-11-13-14-15 | Semiautomatic | Ha04 / effect | Serious/Minor |
| V24 | Return VFD alarms 16-17-22-25-29 | Semiautomatic | global / total shutdown | Serious/Minor |
| V25 | Return VFD alarms 34-40-41-50-51 | Semiautomatic | individual / stop return fan | Serious/Minor |
| V26 | Return VFD alarms 52-53-54-55 | Semiautomatic | | Serious/Minor |
| Z01 | No active alarms | | | |
| Z02 | Alarms reset | | | |

Tab. 10.a

# 11. PCO MANAGER

## 11.1 Installation

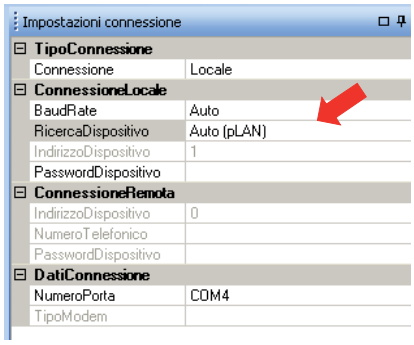
On the http://ksa.carel.com website, under the pCO sistema section, select pCO_manager. After having accepted the general license conditions for free use of the software, a dialogue box is displayed for downloading the pCO_manager.zip file.

## 11.2 PC - pCO controller connection

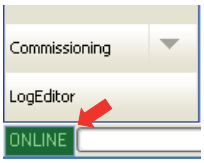
The computer's USB port must be connected via cable to the USB/RS485 converter and this must be connected via a telephone cable to the pLAN port on the pCO.
When opening the pCO_manager program, a screen is shown with the connection settings at the top right. Choose:

1. local connection;
2. baudrate: Auto;
3. search device: Auto (pLAN).

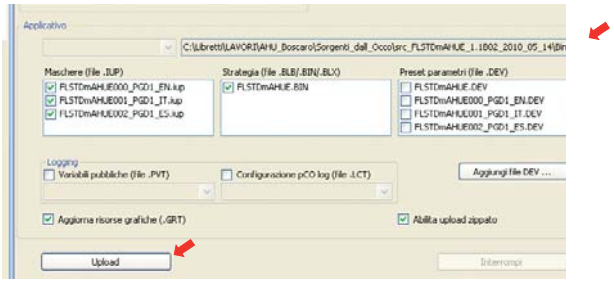
As regards the port number, follow the instructions in the wizard for automatic recognition (e.g. COM4).




Power down the controller and then power up again, click the button to make the connection; once connected the "ONLINE" icon will flash in the bottom left corner.

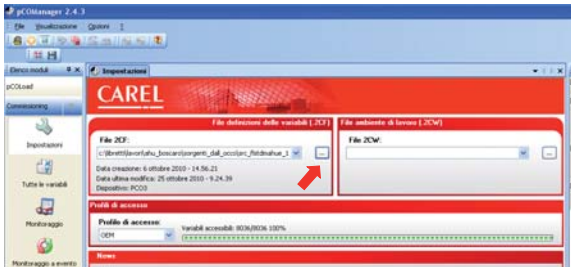




Select the directory where the application files are located and select "Upload" to load the application to the pCO controller.

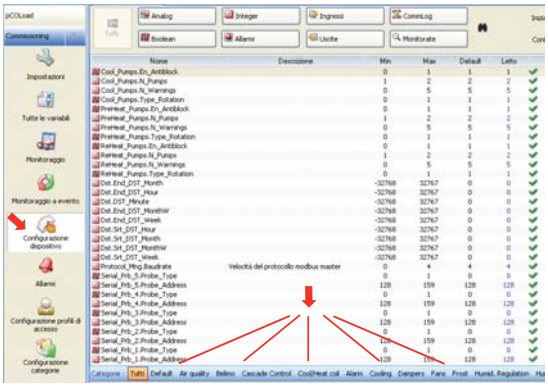



## 11.3 Commissioning

Use the mouse to select "commissioning" at the bottom left. A new work area will be displayed. Select the directory where the ".2cf" files are located.

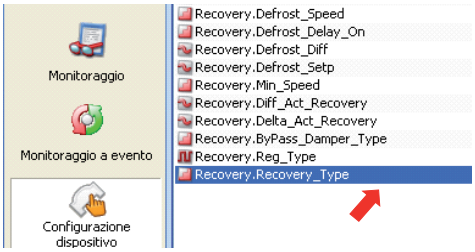




Select the configure device function to show all the application variables. These can be selected based on the categories shown below:



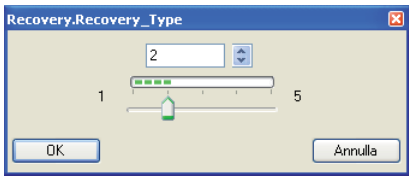
### Setting a parameter

Choose the category of parameters and then the desired parameter: this will be highlighted in blue (e.g. recovery.recovery_type).




To set the parameter:

1. double click the "read" column. A dialogue box is displayed for entering the new value of the parameter.




2. choose the new value (e.g. 3) and then click OK. The new value will be shown in the "written" column. To write the parameter to the pCO controller, press the right mouse button and then select "write selected". The value will be shown in the "written" column as confirmation.


At the end, select "Save" to generate the ".2cw" project file.

Notes:

Notes:

CAREL

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